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जल गुणवत्ता वर्ष पुस्तिका

WATER QUALITY YEAR BOOK

जून 2016- मई 2017 June 2016 - May 2017

गौण उपनदियाँ

SMALL TRIBUTARIES

जल विज्ञानीय प्रेक्षण परिमण्डल

HYDROLOGICAL OBSERVATION CIRCLE

केन्द्रीय जल आयोग

CENTRAL WATER COMMISSION

वाराणसी

VARANASI

PREFACE

Water is a prime natural resource and basic human need. The National Water Policy lays stress on planning and development of water resources on a national perspective. The prime requisite of water resources planning is indeed an efficient information system on the quantity and quality of this time and space variable precious natural asset. In present times due to fast pace of development and increasing population the quality of waters in our river systems is under tremendous pressure, thereby posing a challenge to preserve the quality of waters and at the same time to clean up the already polluted rivers.

The Central Water Commission in its capacity as an apex technical organisation in the field of water resources development endeavours the gigantic task of collection and compilation of Water Quality data incorporating the quality and quantity of available waters in various basins of the country. The Water Quality Books of various river basins of the country are being published by Central Water Commission.

The present volume contains information and trend on various water quality parameters measured at **Meza Road site** on tons river and **Akbarpur site** on Chhoti Saryu, **tributaries of Ganga river** for the year 2016-2017.

The valuable guidance and inspiration of **Shri Pradeep Kumar, Member(RM)**, CWC, New Delhi and **Shri S. K. Sibal, Chief Engineer**, Upper Ganga Basin Organisation, CWC, Lucknow is gratefully acknowledged.

I would like to place on record the special contribution made by officers and staff of Hydrological Observation Circle, Varanasi and Middle Ganga Division-III, Varanasi in compilation of information and publication of the report in present form.

It is hoped that this publication will be found useful for the planners, managers and users in the field of water resources.

(Anupam Prasad)
SUPERINTENDING ENGINEER
HYDROLOGICAL OBSERVATION CIRCLE
VARANASI

August, 2017

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1. INTRODUCTION

1.1. Scope

Rapidly increasing population, rising standard of living ,exponential growth of industrialized and urbanization have exposed the Water Resources in general and rivers in particular to various form of degradation. It is therefore necessary to keep vigilant watch of quality of available fresh waters whose major sources in our country are rivers.

1.2. Source of Information

Middle Ganga Division No.-III, Varanasi of Hydrological Observation Circle, Central Water Commission, Varanasi is conducting Water quality observations and analysis at Mezaroad site on river Tons and at Akbarpur on river Choti Saryu , small tributaries of Ganga.

The finalised Water quality data for the year 2016-2017 is presented in this book. The details of the sites are given in Table 1 and located in index Map.

T A B L E 1

S.No.	Name of Site	Station Code
Middle Ganga Division No. III, Varanasi		
1.	Mezaroad / Tons	GGZOOB4
2.	Akbarpur / Chhoti Saryu	GGVOOT6

1.3. Observation Technique

Water samples from all the Water Quality stations are collected on 1st working day of the month and transported to divisional laboratory where systematic analysis is conducted for the determination of constituents like pH, Specific Conductance, Potassium (as K^{+}), Sodium (as Na^{+}), Calcium (as Ca^{++}), Magnesium (as Mg^{++}), Iron (as Fe^{++}), Nitrogen Ammoniacal (as NH_4-N), Carbonate (as CO_3^{--}), Bicarbonate (as HCO_3^{-}), Chloride (as Cl^{-}), Fluoride (as F^{-}), Sulphate (as SO_4^{--}), Nitrate (as NO_3^{-}), Nitrite (as NO_2^{-}), Phosphate (as PO_4^{---}), Silica (as SiO_2) and Boron (as B).

pH and Specific Conductance are determined by digital pH meter and conductivity meter. Cl^-, CO_3^{--}, HCO_3^- , Ca^{++} and Mg^{++} are estimated by titration method. SO_4^{--} is estimated by turbidimetric method with the help of Nephelometer. Na^+ and K^+ estimation is done by the method of flame emission with the help of Flame photometer and rest by the method of colorimetric estimation with the help of U-V Spectrophotometer.

In addition to the above, Dissolved Oxygen is also estimated. Biochemical Oxygen Demand, Chemical Oxygen Demand and Microbiological Parameters such as Total Coliform & Fecal Coliform are determined at selected sites.

2. WATER QUALITY DATA

2.1 Explanatory Notes

The explanatory notes, described hereunder, are designed to assist in the interpretation of various parameters contained in the data presented subsequently.

i) The water samples are collected at a regular frequency of once in a month usually on the 1st working day from the main flowing portion of the stream.

ii) Dissolved Oxygen is measured at the site laboratory within an hour of collection of samples.

iii) The other water quality parameters are analysed at the divisional laboratory.

iv) Chemical Indices, namely, Hardness Number, Sodium Percentage, Sodium Adsorption Ratio and Residual Sodium Carbonate are calculated as follows :

Hardness Number (HAR) is calculated by adding the total Ca^{++} and Mg^{++} in the sample expressed as equivalent parts of $CaCO_3$.

a. Sodium Percentage (S.P.) is given by

$$S.P.= (Na^+ x100) / (Ca^{++} + Mg^{++} + Na^+ + K^+)$$

Ionic concentrations being in meq/litre.

b. Sodium Adsorption Ratio (S.A.R.) is given by

$$S.A.R. = Na^+ / \{(Ca^{++} + Mg^{++})/2\}^{½}$$

Where the ionic concentration being in meq/litre.

c. Residual Sodium Carbonate (R.S.C.) is given by

$$R.S.C. = (CO_3^{--} + HCO_3^{-}) - (Ca^{++} + Mg^{++})$$

Where concentration of all the ions being in meq/litre.

v) Water year ranges from June 1st of one calendar year to May 31st of the next calendar year and covers one complete hydrological cycle.

vi) The gauging station code number is a unique seven column alpha-numeric reference number which facilitates storage and retrieval of water quality data in data banks. The first column is identifier of either an integral river basin or for convenience, a region having several contiguous river catchments. This is followed by a column which identifies an independent river system which either have one or more outlets to the sea or crosses international border to enter another country. The third, fourth and fifth column spaces denote first, second and third order tributaries respectively from the mouth upstream. The sixth and seventh column spaces indicate the location of the gauging station in one of the 225 slots earmarked on the river. The blank column spaces are filled by zero.

2.2 Method of Presentation

In the succeeding pages, station-wise water quality data and its trend is presented, comprising history sheet and water quality analysis tables.

History sheet gives concise description of the water quality observation station. The water quality analysis tables are given season-wise (flood, winter, summer) for the river water. The samples of water quality analysis are collected once a month as already mentioned in para 2.1 above.

3. WATER QUALITY TOLERANCE AND CLASSIFICATION

As per ISI-IS: 2296-1982, the tolerance limits of parameters are specified as per classified use of water (Table 1,2,3,4,5 Annexed) depending on various uses of water. The following classifications have been adopted in India.

Classification	Type of use
Class A	Drinking water source without conventional treatment but After disinfection.
Class B	Outdoor bathing.
Class C	Drinking water source with conventional treatment followed by disinfection.
Class D	Fish culture and wild life propagation .
Class E	Irrigation , Industrial cooling or controlled waste disposal.

TABLE-1

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS – A

`

S. No.	Characteristic	Tolerance
(i)	pH value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l, ((Min))	6.0
(iii)	Bio-chemical Oxygen Demand ((Max))	2.0
(iv)	Total Coliform Organisms, MPN/100 ml,((Max))	50
(v)	Colour, Hazen units, ((Max))	10
(vi)	Odour	unobjectionable
(Vii)	Taste	Agreeable taste
(viii)	Total Dissolved Solids, mg/l, (Max)	500
(ix)	Total Hardness (as CaCO3), mg/l ,(Max)	300
(x)	Calcium Hardness (as CaCO3), mg/l, (Max)	200
(xi)	Magnesium (as CaCO3), mg/l,(Max)	100
(xii)	Copper (as Cu), mg/l, (Max)	1.5
(xiii)	Iron (as Fe), mg/l,(Max)	0.3
(xiv)	Manganese (as Mn), mg/l,(Max)	0.5
(xv)	Chlorides (as Cl), mg/l,(Max)	250
(xvi)	Sulphate (as SO4), mg/l ,(Max)	400
(xvii)	Nitrates (as NO2), mg/l,(Max)	20
(xviii)	Fluorides (as F,) mg/l,(Max)	1.5
(xix)	Phenolic compounds(as C6H5OH), mg/l,(Max)	0.002
(xx)	Mercury (as Hg), mg/l ,(Max)	0.001
(xxi)	Cadmium (as Cd), mg/l,(Max)	0.01
(xxii)	Selenium (as Se), mg/l ,(Max)	0.01
(xxiii)	Arsenic (as As), mg/l,(Max)	0.05
(xxiv)	Cyanides (as CN), mg/l, (Max)	0.05
(xxv)	Lead (as Pb), mg/l, (Max)	0.1
(xxvi)	Zinc (as Zn), mg/l, (Max)	15
(xxvii)	Chromium (asCr6+), mg/l,(Max)	0.05
(xxviii)	Anionic detergents, (as MBAS), mg/l ,(Max) .	0.2
(xxix)	Poly-nuclear aromatic hydrocarbons (PAH),	0.2
(xxx)	Barium (as Ba), mg/l ,(Max)	1.0
(xxxi)	Silver (as Ag), mg/l (Max)	0.05
(xxxii)	Pesticides	Absent
(xxxiii)	Alpha emitters, µc/ml, (Max)	10^{-9}
(xxxiv)	Beta emitters, µc/ml, (Max)	10^{-8}

TABLE- 2

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS – B

S. No.	Characteristic	Tolerance
(i)	pH Value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l,(Min)	5.0
(iii)	Biochemical Oxygen Demand (5 days at 20 °C), (Max)	3.0
(iv)	Total Coliform Organisms, MPN/100 ml, (Max)	500
(v)	Fluorides (as F)<mg/l, (Max)	1.5
(vi)	Colour, Hazen units, (Max)	300
(vii)	Cyanides (as CN), mg/l, (Max)	0.05
(viii)	Arsenic (as As), mg/l, (Max)	0.2
(ix)	Phenolic Compounds (as C6H5OH) mg/l, (Max)	0.005
(x)	Chromium (as Cr6+), mg/l, (Max)	1.0
(xi)	Anionic detergents (as MBAS), mg/l, (Max)	1.0
(xii)	Alpha emitters, µc/ml, (Max)	10^{-8}

TABLE- 3

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS – C

S. No.	Characteristic	Tolerance
(i)	pH Value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l (Min)imum	4.0
(iii)	Biochemical Oxygen Demand	3.0
(iv)	Total coliform organisms, MPN/100 ml, (Max)	5000
(v)	Colour, Hazen units, (Max)	300
(vi)	Fluorides (as F), mg/l ,(Max)	1.5
(vii)	Cadmium (as Cd), mg/l, (Max)	0.01
(viii)	Chlorides (as Cl), mg/l, (Max)	600
(ix)	Chromium (as Cr6+), mg/l, (Max)	0.05
(x)	Cyanides (as CN), mg/l, (Max)	0.05
(xi)	Total Dissolved Solids, mg/l, (Max)	1500
(xii)	Selenium (as Se), mg/l, (Max)	0.05
(xiii)	Sulphates (as SO4), mg/l, (Max)	400
(xiv)	Lead (as Pb), mg/l, (Max)	0.1
(xv)	Copper (as Cu),mg/l,(Max)	1.5
(xvi)	Arsenic (as As), mg/l, (Max)	0.2
(xvii)	Iron (as Fe), mg/l, (Max)	50
(xviii)	Phenolic compounds (as C6H5OH), mg/l, (Max)	0.005
(xix)	Zinc (as Zn), mg/l, (Max)	15
(xx)	Insecticides, mg/l, (Max)	Absent
(xxi)	Anionic detergents (as MBAS), mg/l, (Max)	1.0
(xxii)	Oils and grease, mg/l, (Max)	0.1
(xxiii)	Nitrates (as NO3), mg/l,(Max)	50
(xxiv)	Alpha emititers, µc/mg, (Max)	10-9
(xxv)	Beta emitters, µc/ml, (Max)	10-8

TABLE-4

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS -D

S. No.	Characteristic	Tolerance
(i)	pH value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l, (Min).	4.0
(iii)	Free Ammonia (as N), mg/l, (Max).	1.2
(iv)	Electrical Conductance at 25 °C, µ S, (Max)	1000
(v)	Free Carbon Dioxide (as C02),mg/l, (Max)	6.0
(vi)	Oils and Grease, mg/l, (Max)	0.1
(vii)	Alpha emitters, µ c/ml, (Max)	10^{-9}
(viii)	Beta emitters, µ c/ml, (Max)	10^{-8}

TABLE- 5

TOLERANCE LIMITS FOR INLAND SURFACE WATERS,CLASS -E

S. No.	Characteristic	Tolerance
(i)	pH value	6.0 to 8.5
(ii)	Electrical Conductance at 25°C, μ S, (Max)	2250
(iii)	Sodium Adsorption Ratio, (Max)	26
(iv)	Boron (as B), mg/l, (Max)	2.0
(v)	Total Dissolved Solids, (inorganic), mg/l, (Max)	2100
(vi)	Sulphates (as SO4), mg/l, (Max)	1000
(vii)	Chlorides (as Cl), Mg/l, (Max)	600
(viii)	Sodium Percentage, (Max)	60
(ix)	Alpha emitters, μ c/ml, (Max)	10^{-9}
(x)	Beta emitters, μ c/ml, (Max)	10^{-8}

4. WATER QUALITY SCENARIO/ TREND

Surface-water-quality trends assists resource managers in identifying nature and extent of emerging water-quality concerns, planning remedial measures, evaluating their effectiveness and prioritization of pollution control efforts. This section presents the Scenario of important water quality parameters based on the results of data analysis of the Mezaroad WQ site on the river Tons and Akbarpur WQ site on river Chhoti Saryu , tributaries of river Ganga.

4.1 Tons River :

River Tons is a tributary of river Ganga. Middle Ganga Division-3, Varanasi has established One Water quality monitoring station at Mezaroad. The monitoring of surface water is done on monthly basis and water samples are analysed for physico-chemical and bacteriological parameters apart from the field observations.

W.Q. Network

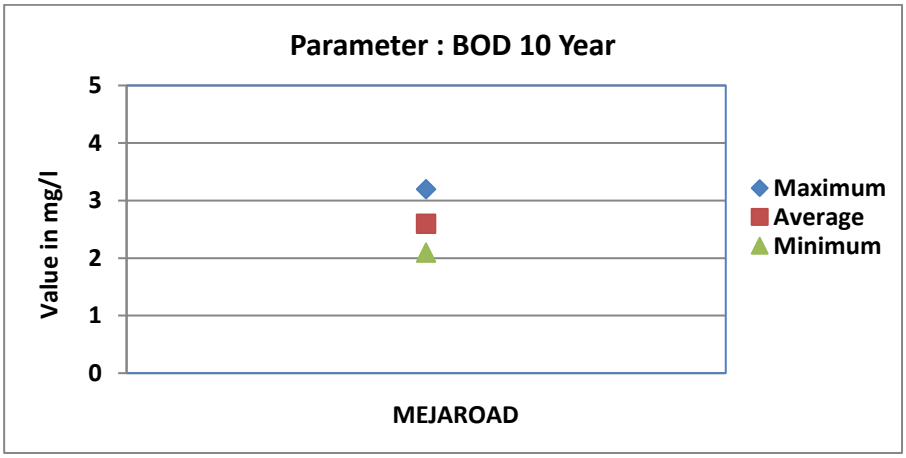
S.No.	Name of Site	River	Class
1	Mezaroad	Tons	Trend

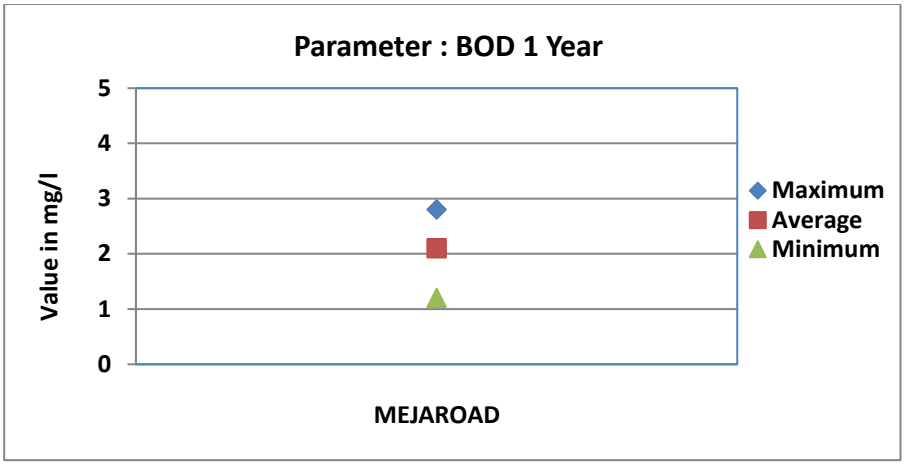
4.1.1 SCENARIO/TRENDS OF DIFFERENT WATER QUALITY PARAMETERS.

4.1.1.1 Biological Oxygen Demand (BOD) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception (2009-10)	10 year*	One year (2015-16)	Since inception	10 year*	One year	Since inception	10 year*	One year
Mejaroad	-	3.2	2.7	-	2.1	1.2	-	2.6	2.1

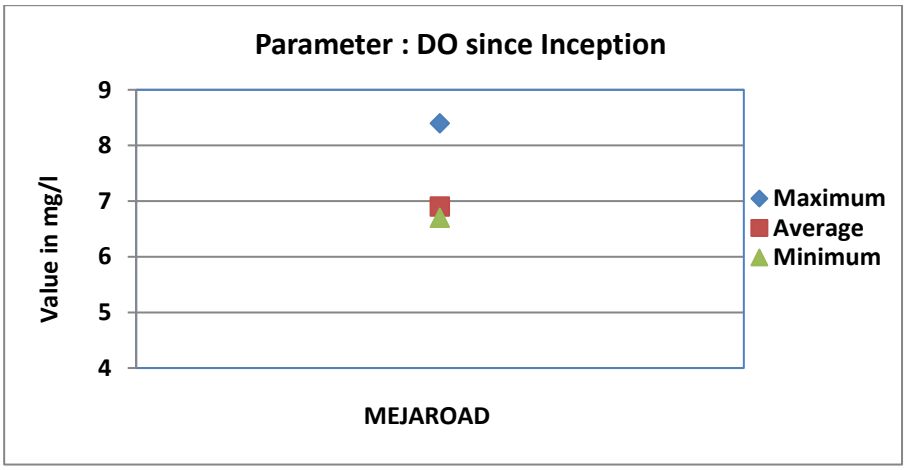
***Starting from 2009-2010.**

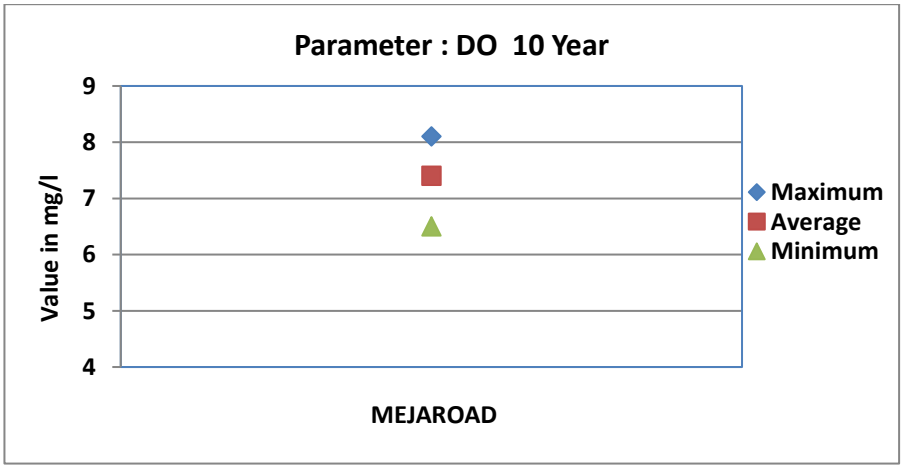


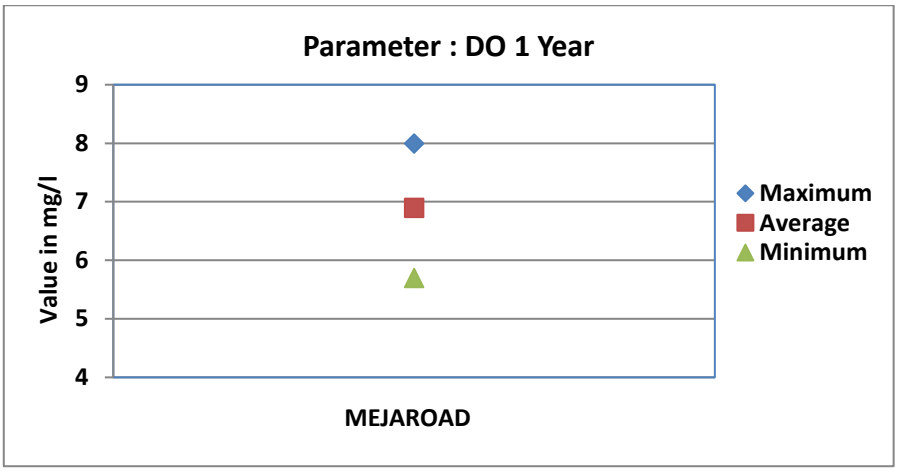


4.1.1.2 Dissolved Oxygen (DO) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception from 1989-90	10 year 2005-06	One year 2015-16	Since inception	10 year	One year	Since inception	10 year	One year
Mejaroad	8.4	8.1	8.0	6.7	6.5	5.7	7.6	7.4	6.9

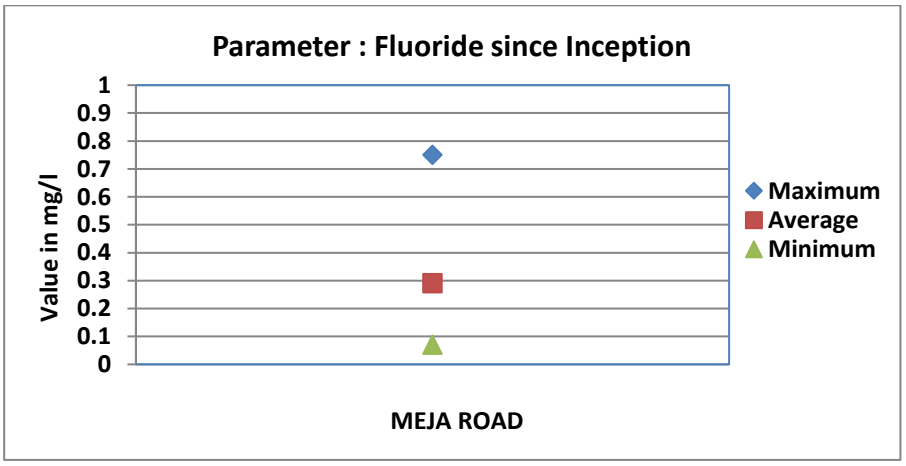


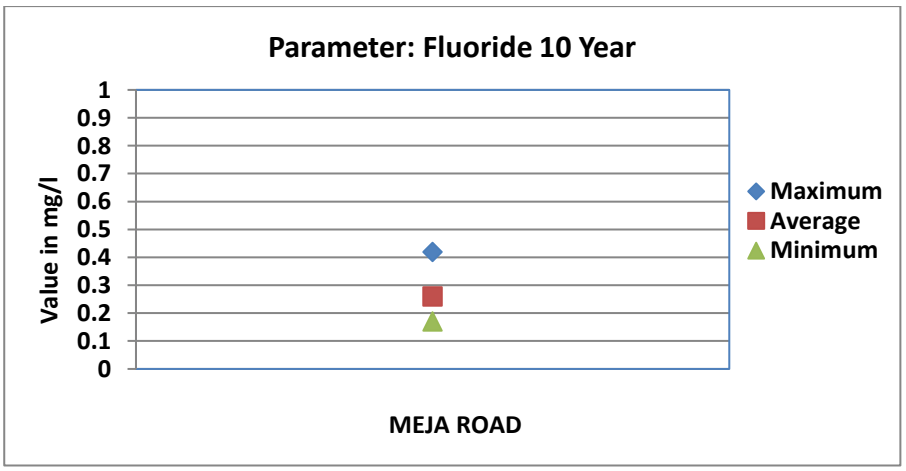


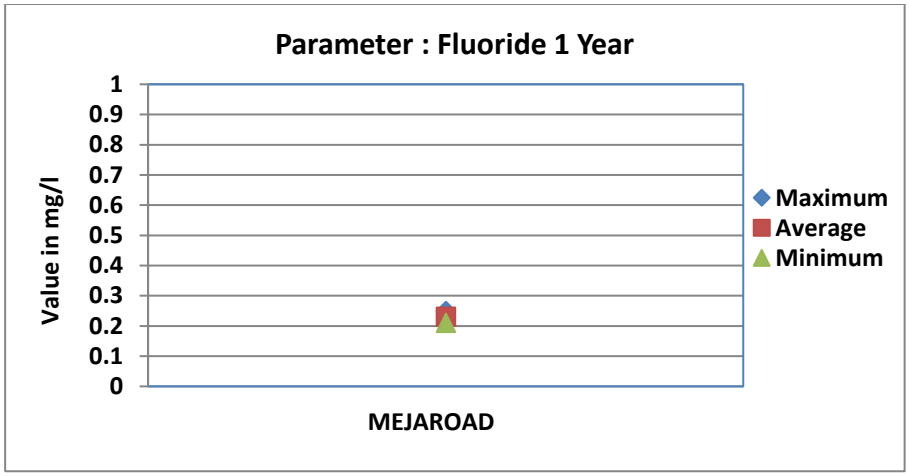


4..1.1.3 Fluoride in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception from 1980-81	10 year 2005-06	One year 2015-16	Since inception	10 year	One year	Since inception	10 year	One Year
Mejaroad	0.75	0.42	0.25	0.07	0.17	0.21	0.29	0.26	0.23



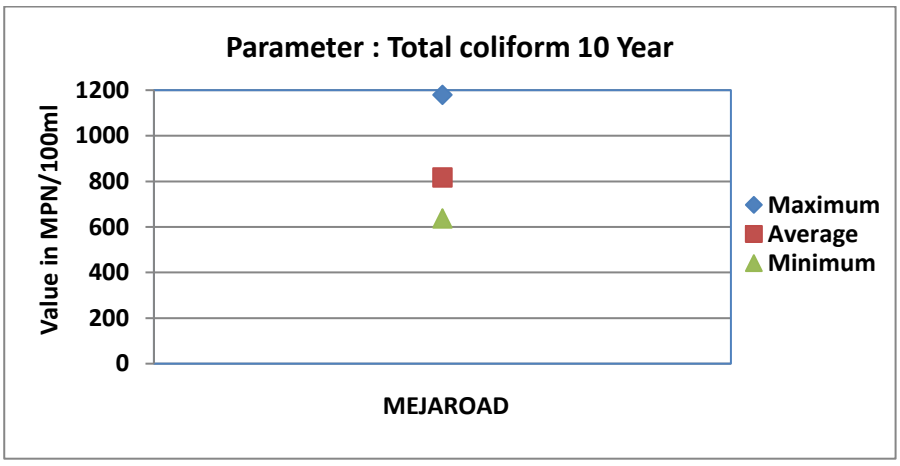


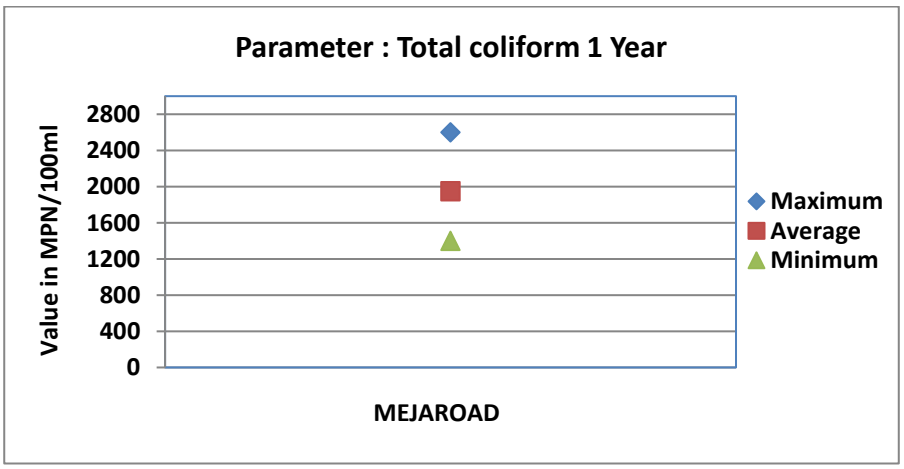


4.1.1.4 Total coliform in MPN/100ml

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception (May 2007)	10 year (2006-07)	One year (2015-16)	Since inception	10 year	One year	Since inception	10 year	One year
Mejaroad	-	1180	2600	-	638	1400	-	818	1950

Note :*Total coliform started from May 2007 at Mejaroad.

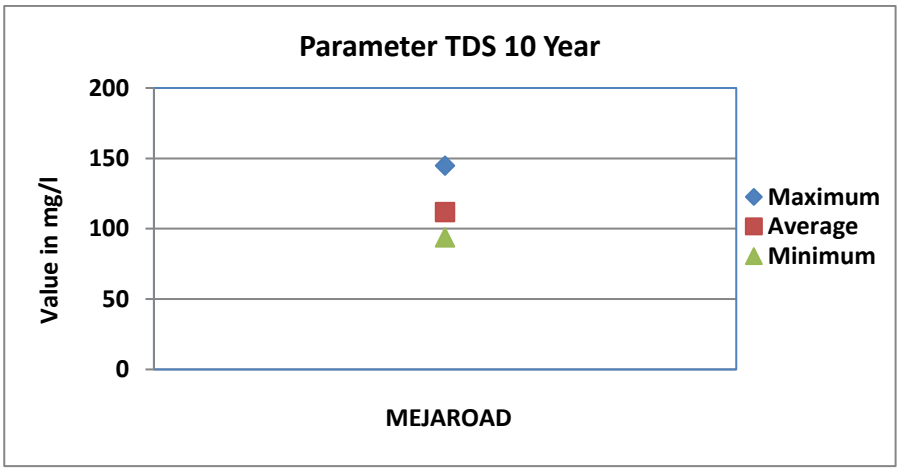


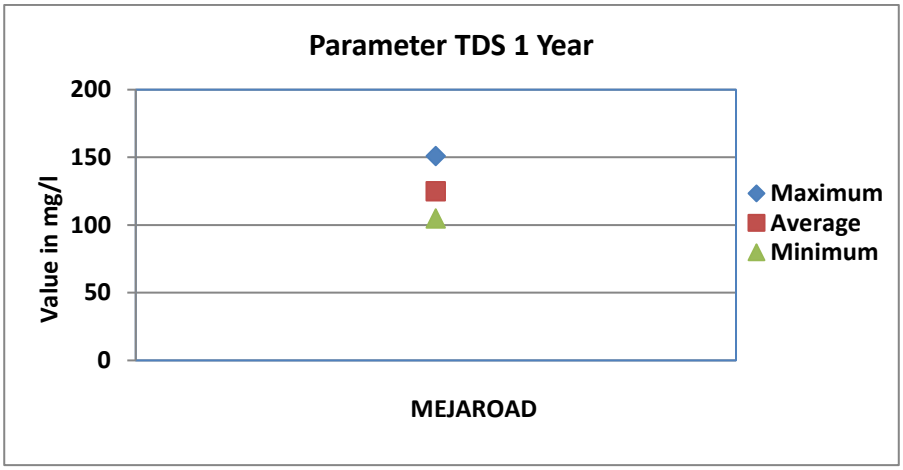


4.1.1.5 TDS in mg/l

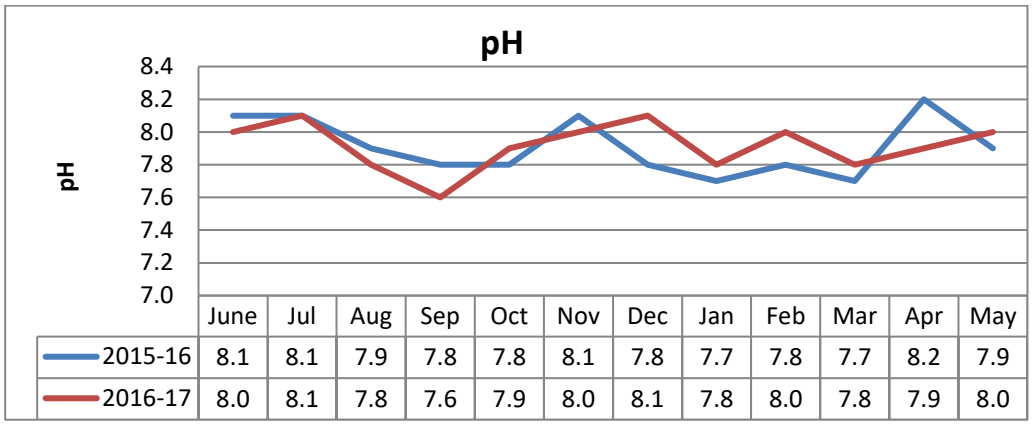
Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception (2009-10)	10 year (2009-10)	One year (2015-16)	Since inception	10 year	One year	Since inception	10 year	One year
Mejaroad	-	145	151	-	94	105	-	112	125

Note :TDS started from June 2009 at Mejaroad.

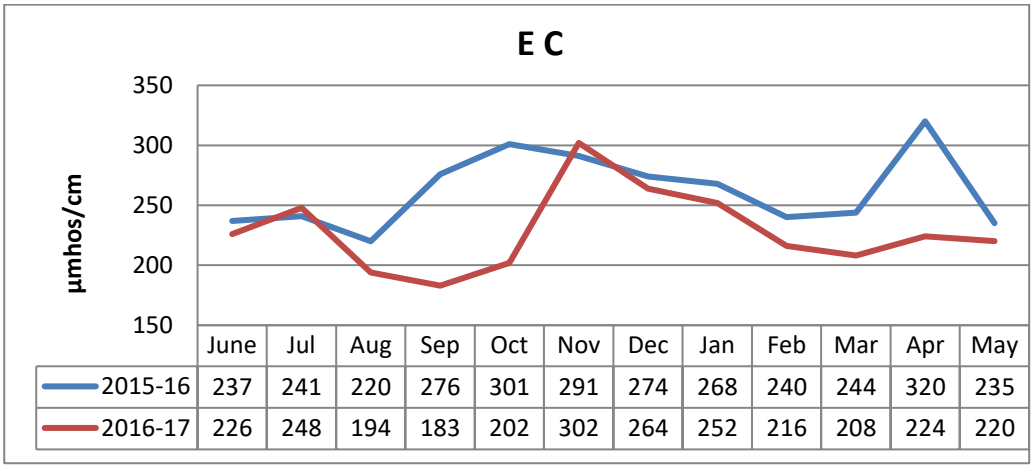




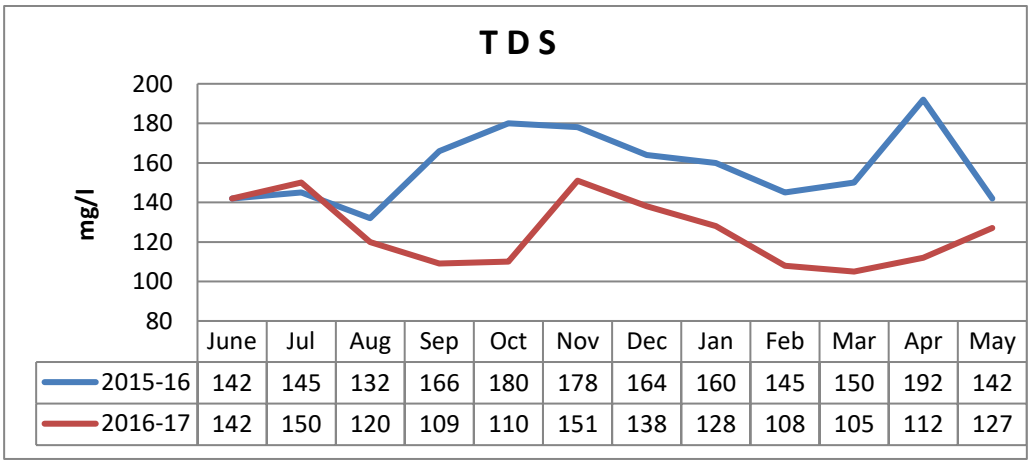
4.1.2 COMPARISION OF DIFFERENT WATER QUALITY PARAMETERS VALUES IN 2015-16 Vs 2016-17.



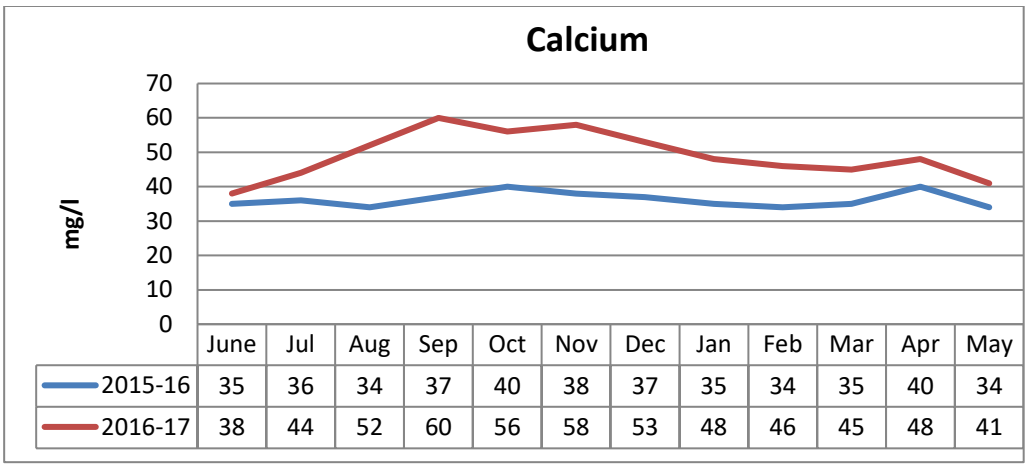
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	8.1	8.1	7.9	7.8	7.8	8.1	7.8	7.7	7.8	7.7	8.2	7.9
2016-17	8.0	8.1	7.8	7.6	7.9	8.0	8.1	7.8	8.0	7.8	7.9	8.0



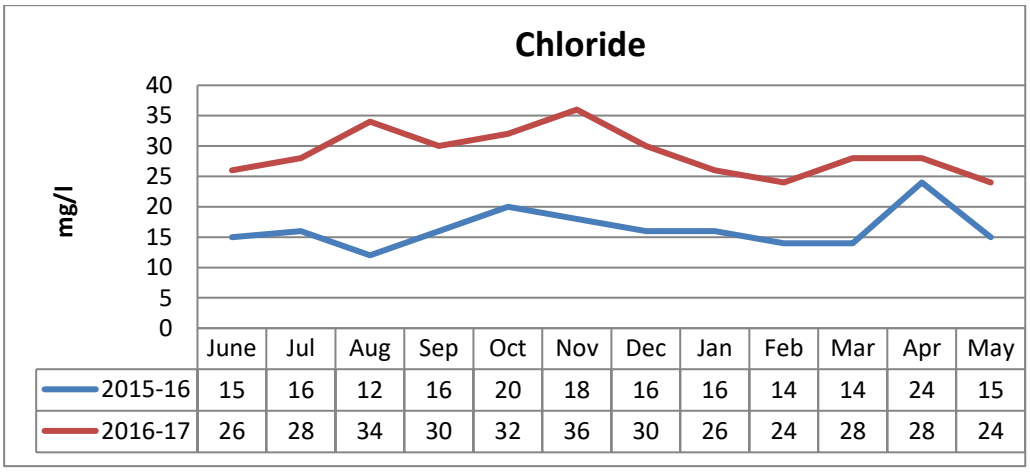
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	237	241	220	276	301	291	274	268	240	244	320	235
2016-17	226	248	194	183	202	302	264	252	216	208	224	220



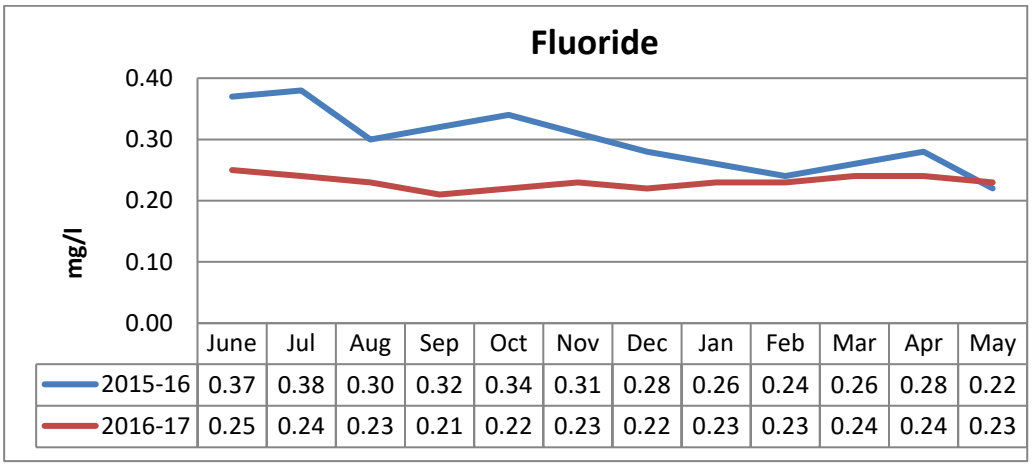
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	142	145	132	166	180	178	164	160	145	150	192	142
2016-17	142	150	120	109	110	151	138	128	108	105	112	127



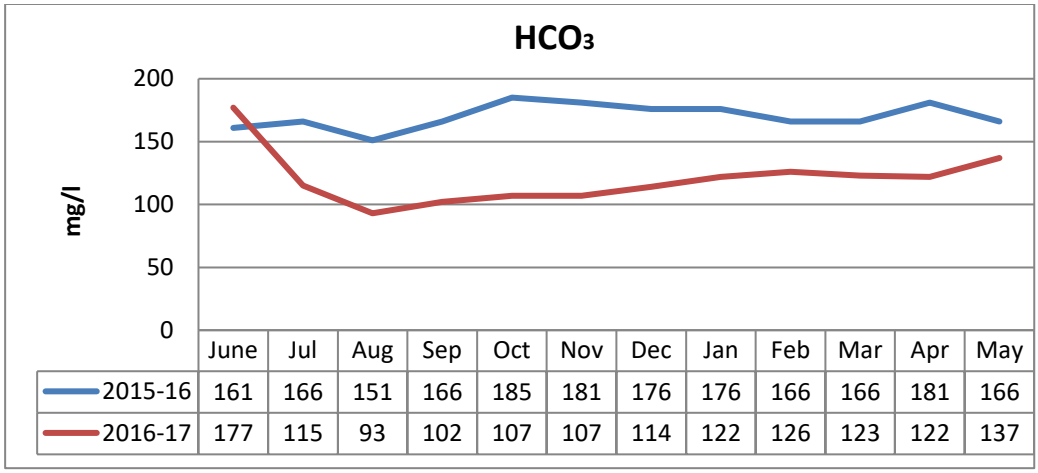
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	35	36	34	37	40	38	37	35	34	35	40	34
2016-17	38	44	52	60	56	58	53	48	46	45	48	41



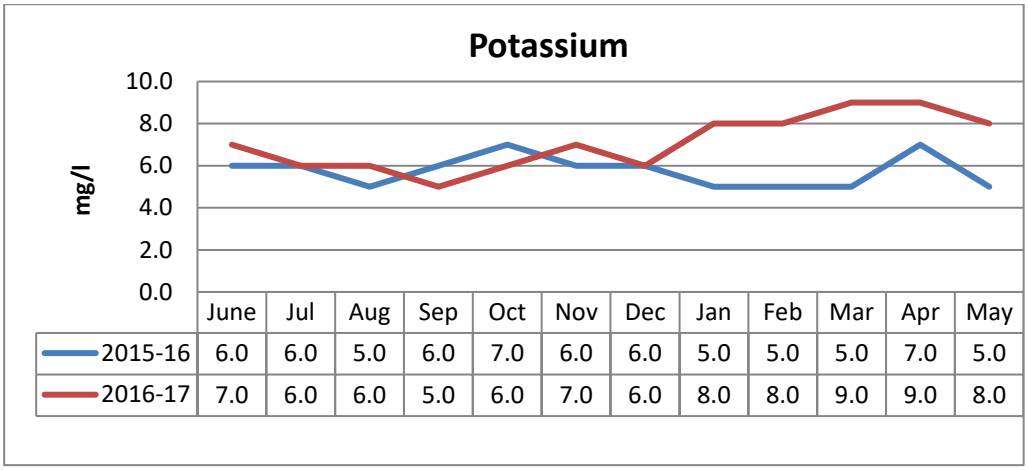
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	15	16	12	16	20	18	16	16	14	14	24	15
2016-17	26	28	34	30	32	36	30	26	24	28	28	24



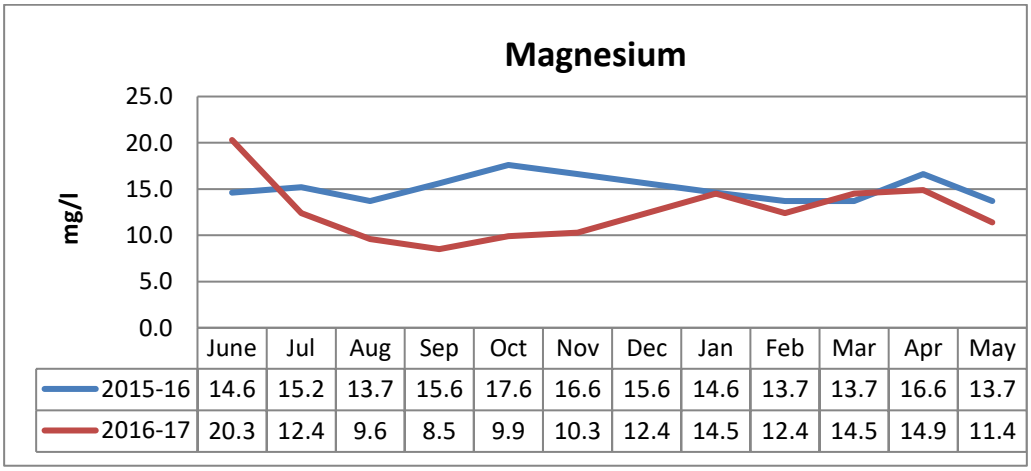
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	0.37	0.38	0.30	0.32	0.34	0.31	0.28	0.26	0.24	0.26	0.28	0.22
2016-17	0.25	0.24	0.23	0.21	0.22	0.23	0.22	0.23	0.23	0.24	0.24	0.23



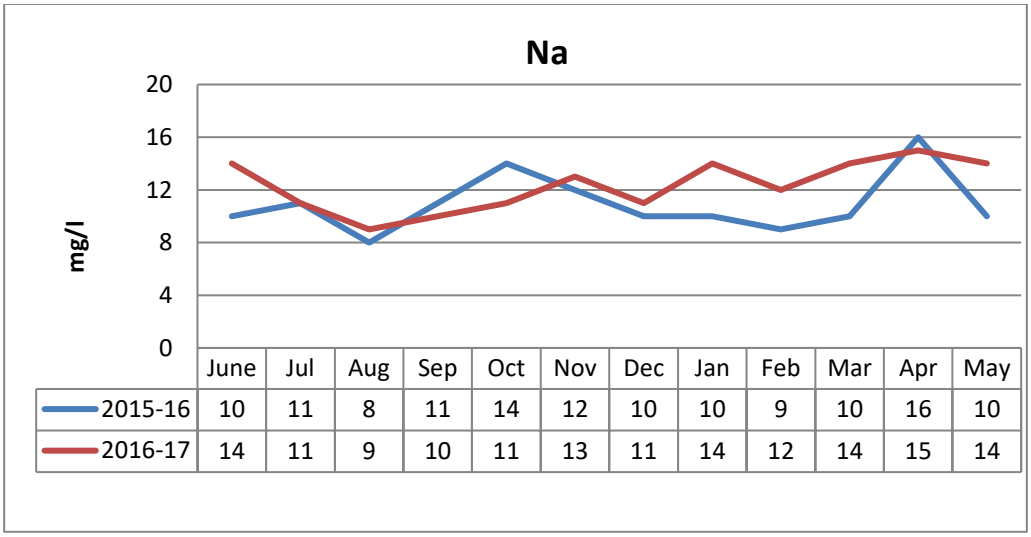
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	161	166	151	166	185	181	176	176	166	166	181	166
2016-17	177	115	93	102	107	107	114	122	126	123	122	137



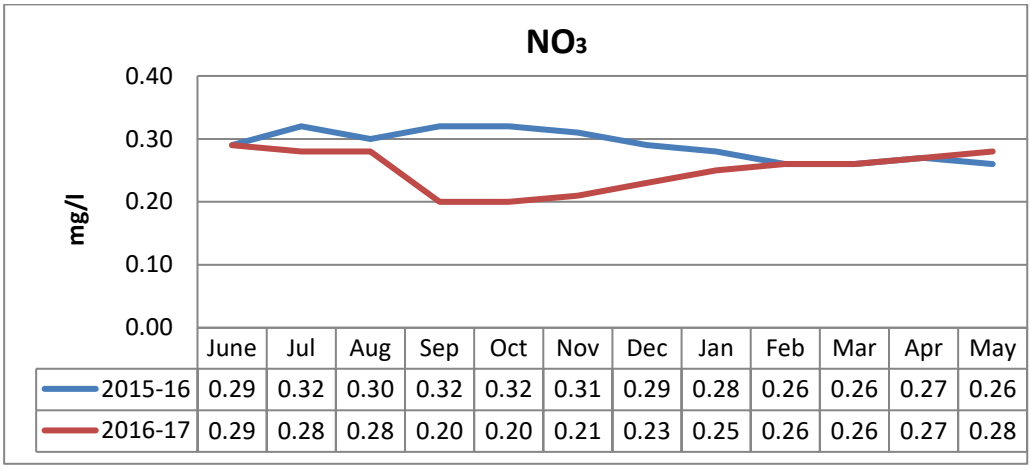
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	6.0	6.0	5.0	6.0	7.0	6.0	6.0	5.0	5.0	5.0	7.0	5.0
2016-17	7.0	6.0	6.0	5.0	6.0	7.0	6.0	8.0	8.0	9.0	9.0	8.0



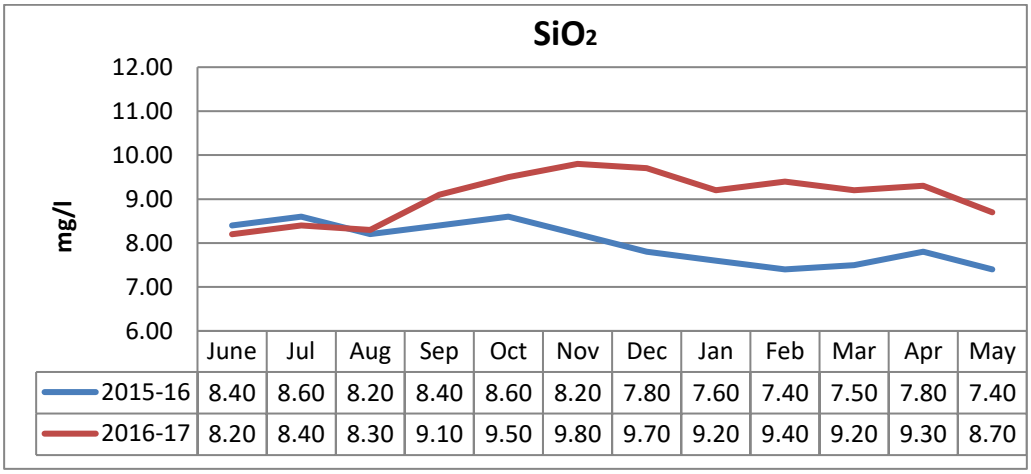
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	14.6	15.2	13.7	15.6	17.6	16.6	15.6	14.6	13.7	13.7	16.6	13.7
2016-17	20.3	12.4	9.6	8.5	9.9	10.3	12.4	14.5	12.4	14.5	14.9	11.4



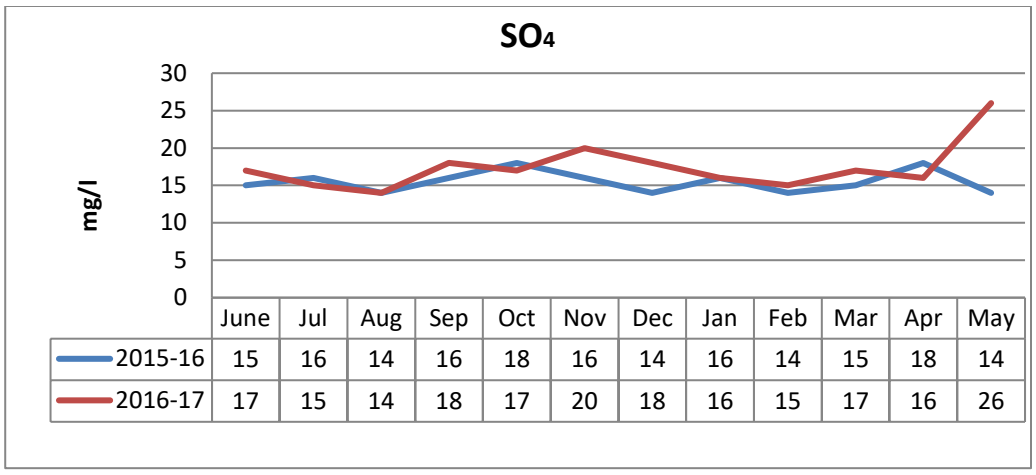
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	10	11	8	11	14	12	10	10	9	10	16	10
2016-17	14	11	9	10	11	13	11	14	12	14	15	14



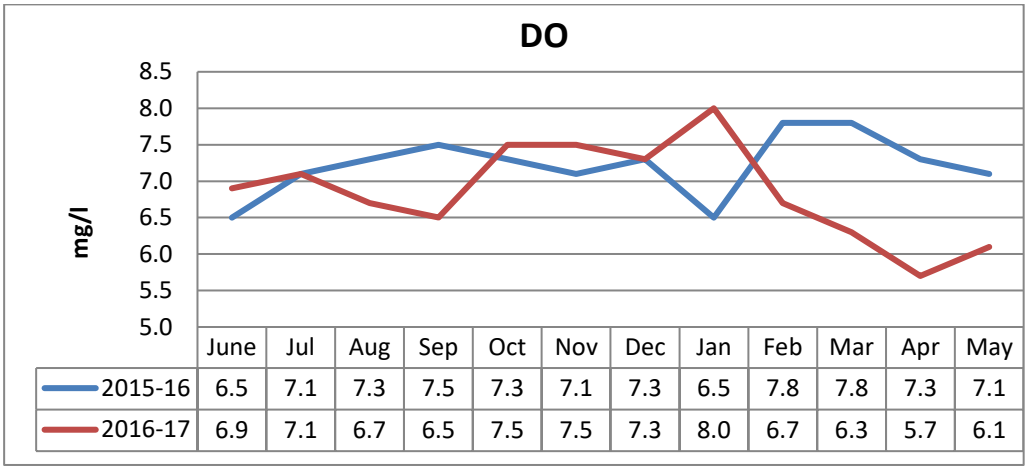
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	0.29	0.32	0.30	0.32	0.32	0.31	0.29	0.28	0.26	0.26	0.27	0.26
2016-17	0.29	0.28	0.28	0.20	0.20	0.21	0.23	0.25	0.26	0.26	0.27	0.28



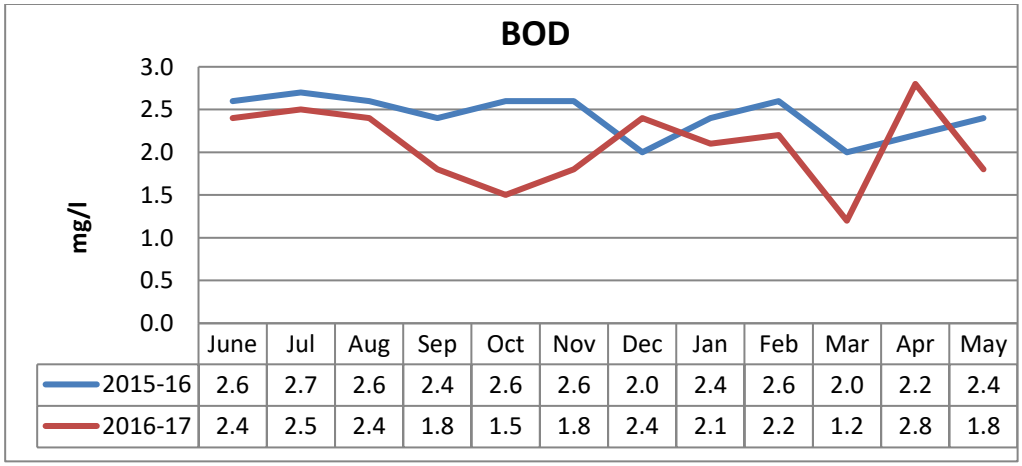
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	8.40	8.60	8.20	8.40	8.60	8.20	7.80	7.60	7.40	7.50	7.80	7.40
2016-17	8.20	8.40	8.30	9.10	9.50	9.80	9.70	9.20	9.40	9.20	9.30	8.70



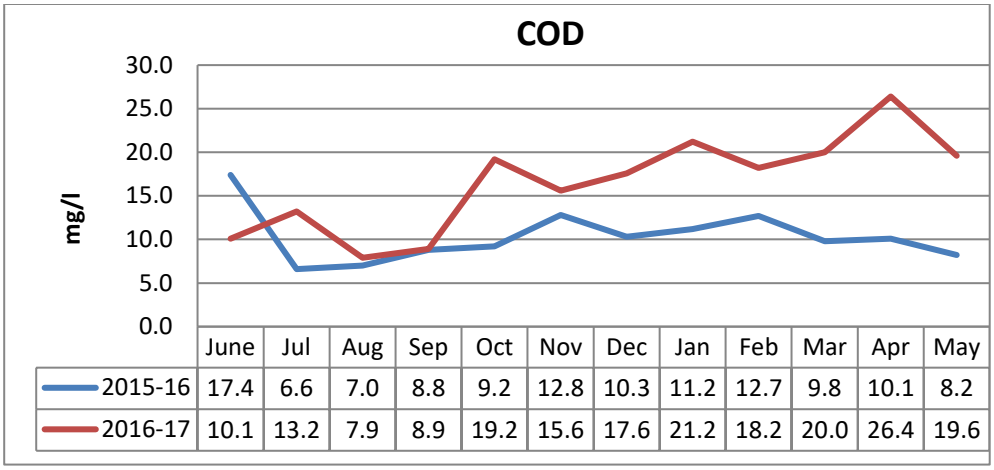
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	15	16	14	16	18	16	14	16	14	15	18	14
2016-17	17	15	14	18	17	20	18	16	15	17	16	26



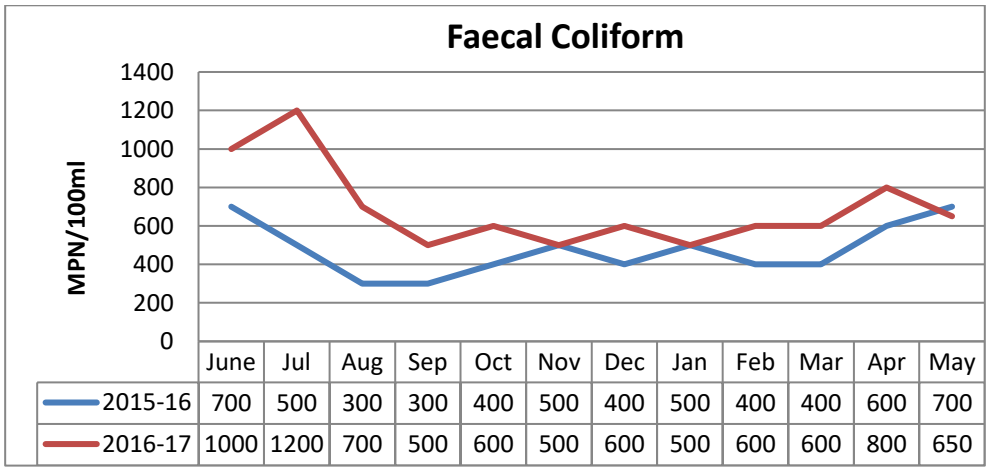
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	6.5	7.1	7.3	7.5	7.3	7.1	7.3	6.5	7.8	7.8	7.3	7.1
2016-17	6.9	7.1	6.7	6.5	7.5	7.5	7.3	8.0	6.7	6.3	5.7	6.1



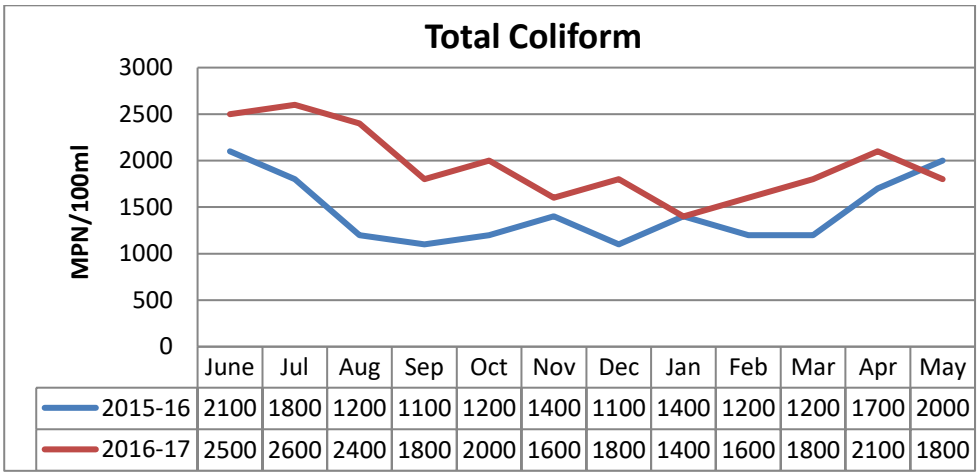
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	2.6	2.7	2.6	2.4	2.6	2.6	2.0	2.4	2.6	2.0	2.2	2.4
2016-17	2.4	2.5	2.4	1.8	1.5	1.8	2.4	2.1	2.2	1.2	2.8	1.8



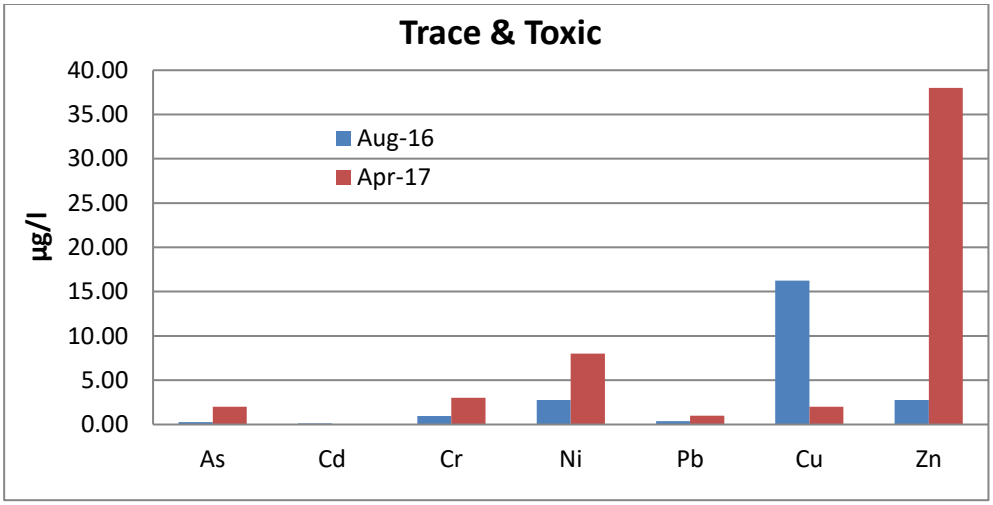
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	17.4	6.6	7.0	8.8	9.2	12.8	10.3	11.2	12.7	9.8	10.1	8.2
2016-17	10.1	13.2	7.9	8.9	19.2	15.6	17.6	21.2	18.2	20.0	26.4	19.6

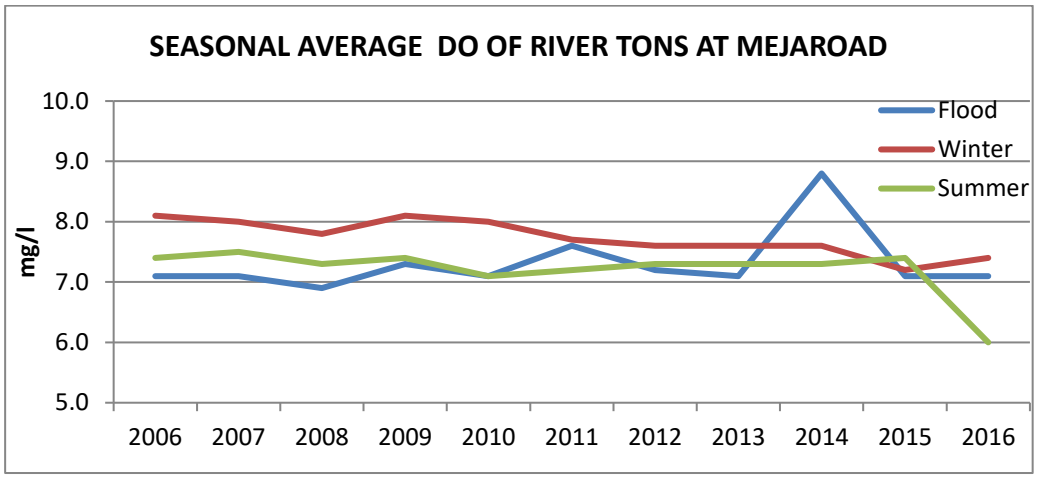


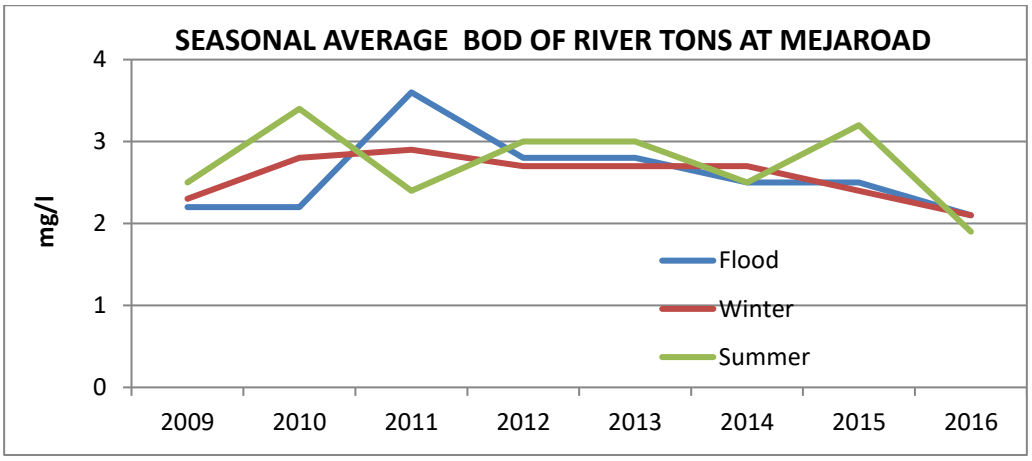
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	700	500	300	300	400	500	400	500	400	400	600	700
2016-17	1000	1200	700	500	600	500	600	500	600	600	800	650



	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	2100	1800	1200	1100	1200	1400	1100	1400	1200	1200	1700	2000
2016-17	2500	2600	2400	1800	2000	1600	1800	1400	1600	1800	2100	1800


Trace & Toxic
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
µg/l
Aug-16
Apr-17
As
Cd
Cr
Ni
Pb
Cu
Zn


SEASONAL AVERAGE DO OF RIVER TONS AT MEJAROAD
10.0
9.0
8.0
7.0
6.0
5.0
mg/l
Flood
Winter
Summer
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016


SEASONAL AVERAGE BOD OF RIVER TONS AT MEJAROAD
4
3
2
1
0
mg/l
Flood
Winter
Summer
2009
2010
2011
2012
2013
2014
2015
2016

4.2 Chhoti Saryu River: River Chhoti Saryu is a tributary of river Ganga. Middle Ganga Division-3, Varanasi has established one Water quality monitoring station at Akbarpur. The monitoring of surface water is done on monthly basis and water samples are analysed for physico-chemical and bacteriological parameters apart from the field observations.

W.Q. Network

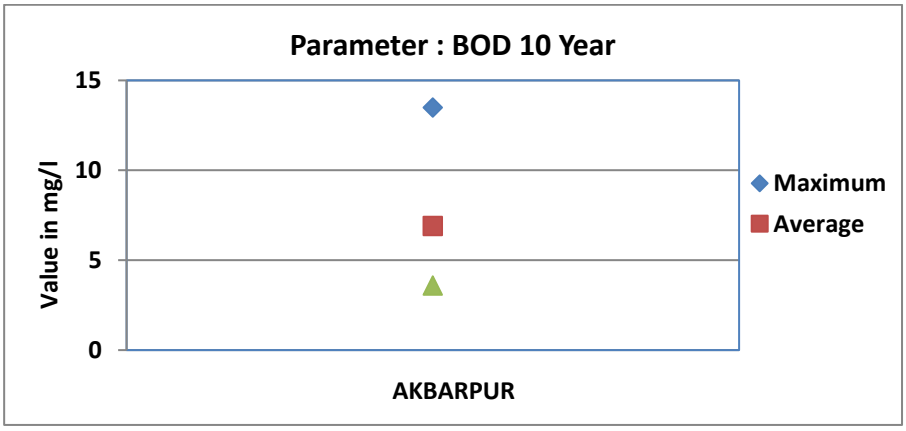
S.No.	Name of Site	River	Class
1	Akbarpur	Chhoti Saryu	Trend

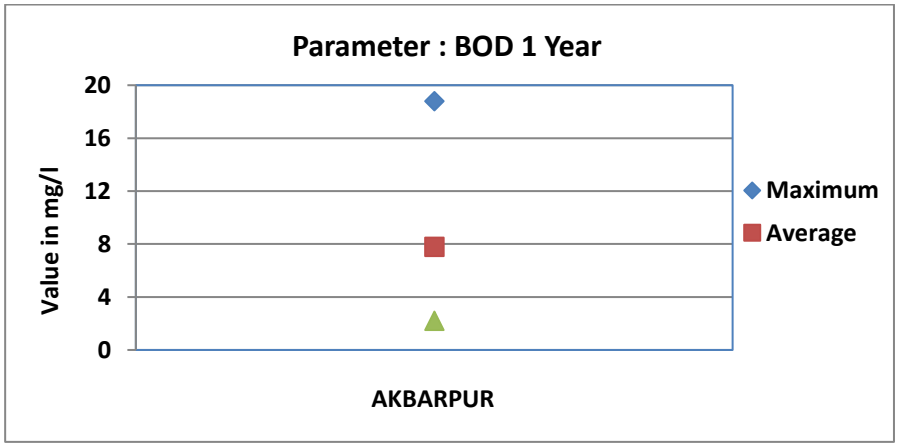
4.2.1 SCENARIO/TRENDS OF DIFFERENT WATER QUALITY PARAMETERS

4.2.1.1Biological Oxygen Demand (BOD) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception (20014-15)	10 year*	One year (2016-17)	Since inception	10 year*	One year	Since inception	10 year*	One year
Akbarpur	-	13.5	18.8	-	3.6	2.2	-	6.9	7.8

***Starting from Aug.2014.**

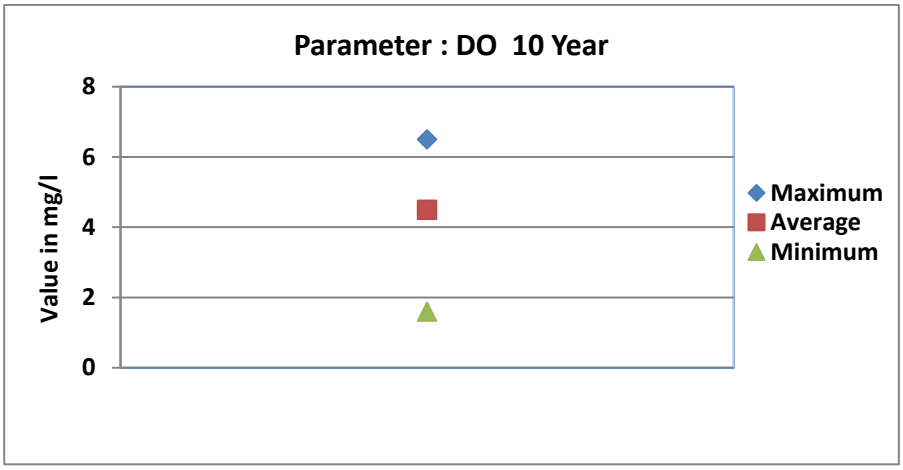


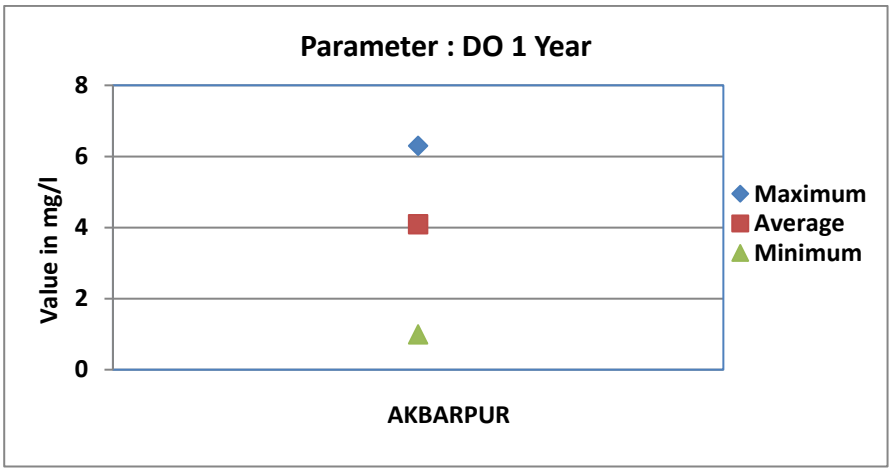


4.2.1.2 Dissolved Oxygen (DO) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception from 2014-15	10 year*	One year 2016-17	Since inception	10 year*	One year	Since inception	10 year*	One year
Akbarpur	-	6.5	6.3	-	1.6	1.0	-	4.5	4.1

***Starting from Aug.2014**

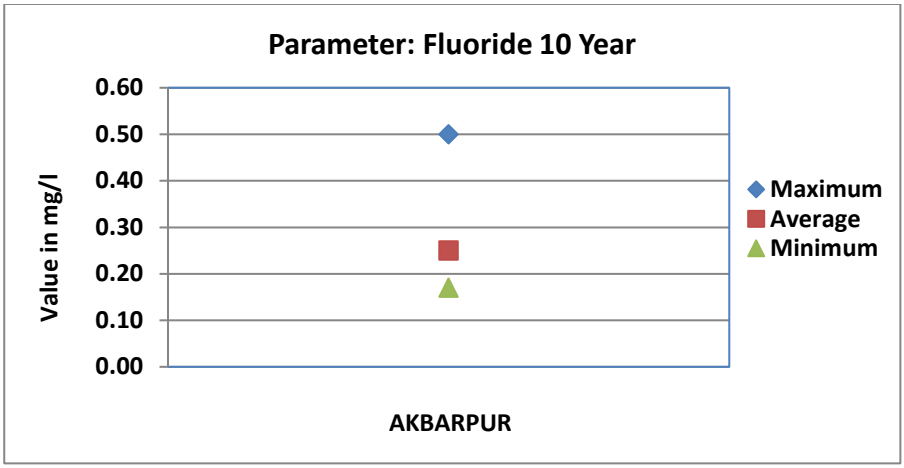


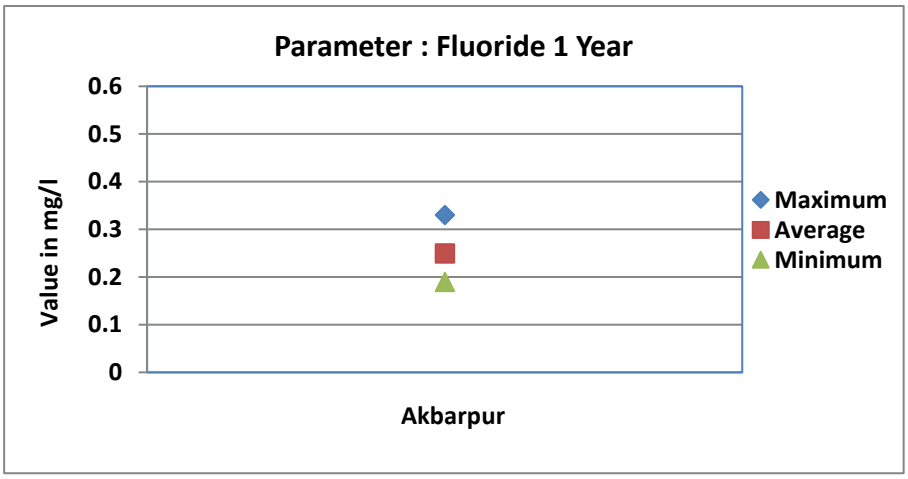


4.2.1.3 Fluoride in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception (from 2014-15)	10 year*	One year 2016-17	Since inception	10 year*	One year	Since inception	10 year*	One Year
Akbarpur	-	0.50	0.33	-	0.17	0.19	-	0.25	0.25

***Starting from Aug.2014.**

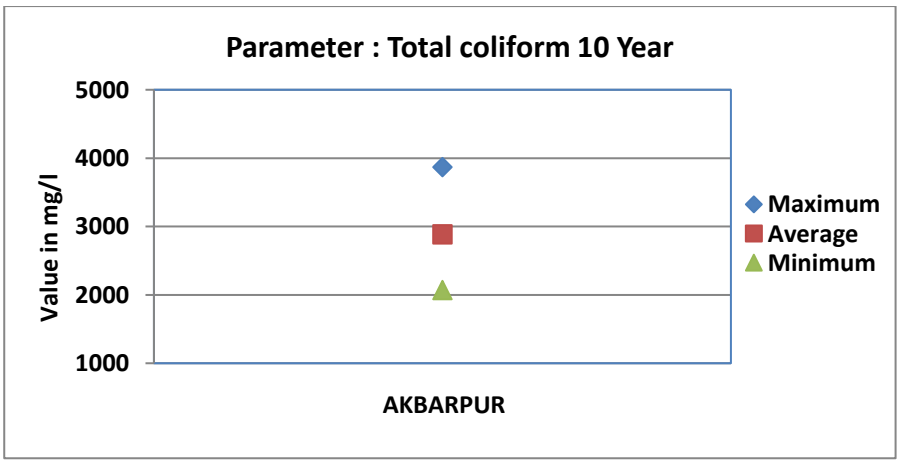


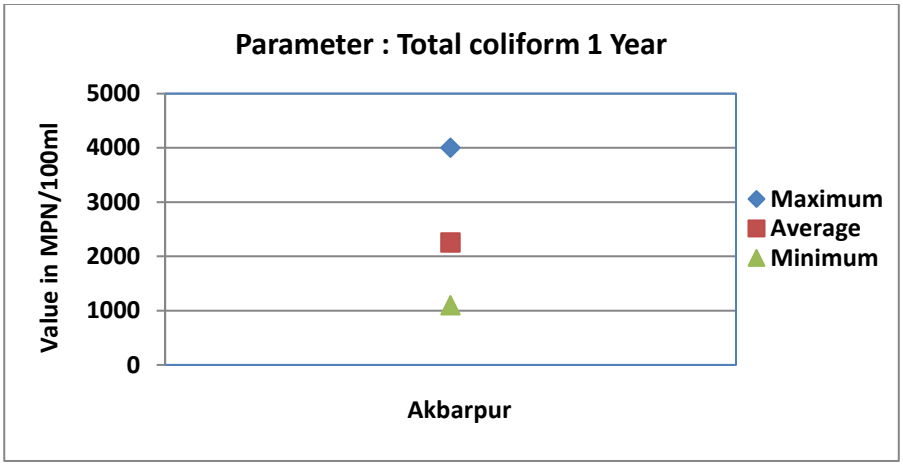


4.2.1.4 Total coliform in MPN/100ml

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception (From 2014-15)	10 year*	One year (2016-17)	Since inception	10 year*	One year	Since inception	10 year*	One year
Akbarpur	-	3867	4000	-	2067	1100	-	2885	2256

***Starting from Aug.2014**

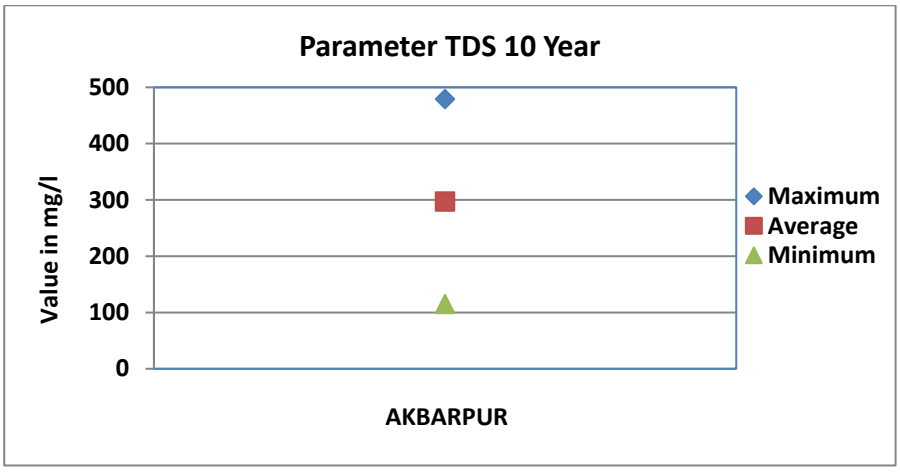


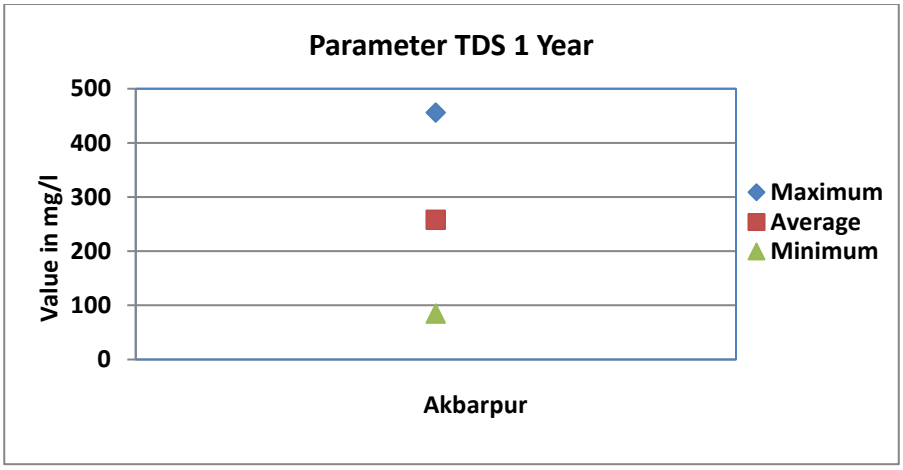


4.2.1.5 TDS in mg/l

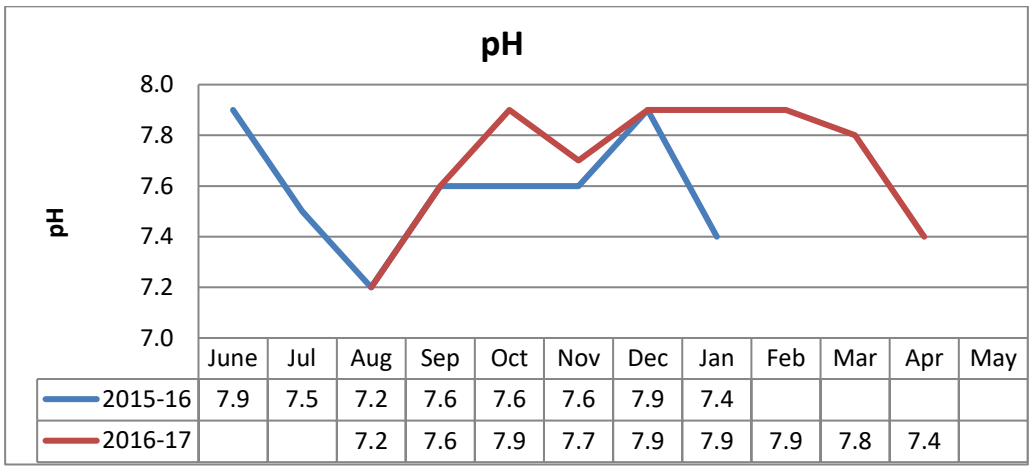
Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception (From 2014-15)	10 year*	One year (2016-17)	Since inception	10 year*	One year	Since inception	10 year*	One year
Akbarpur	-	479	456	-	115	85	-	297	258

***Starting from Aug.2014.**



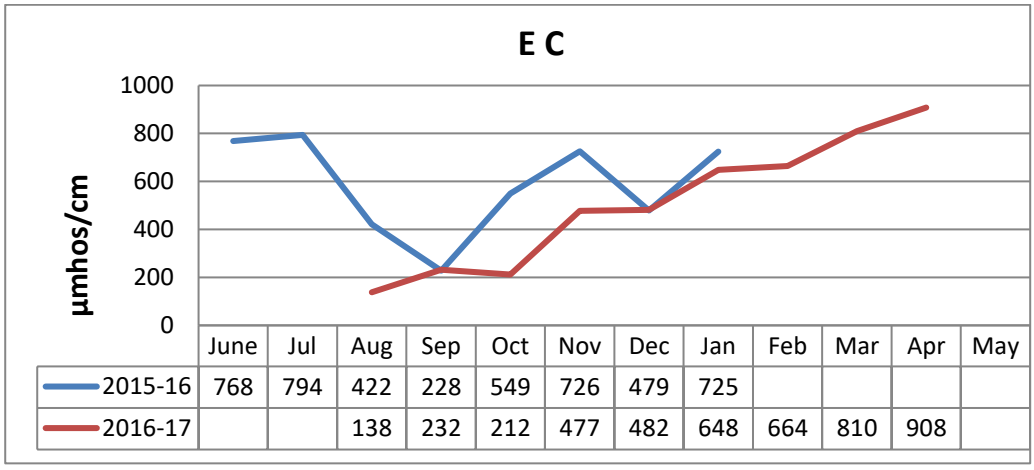


4.2.2 COMPARISION OF DIFFERENT WATER QUALITY PARAMETERS VALUES IN 2015-16 Vs 2016-17.



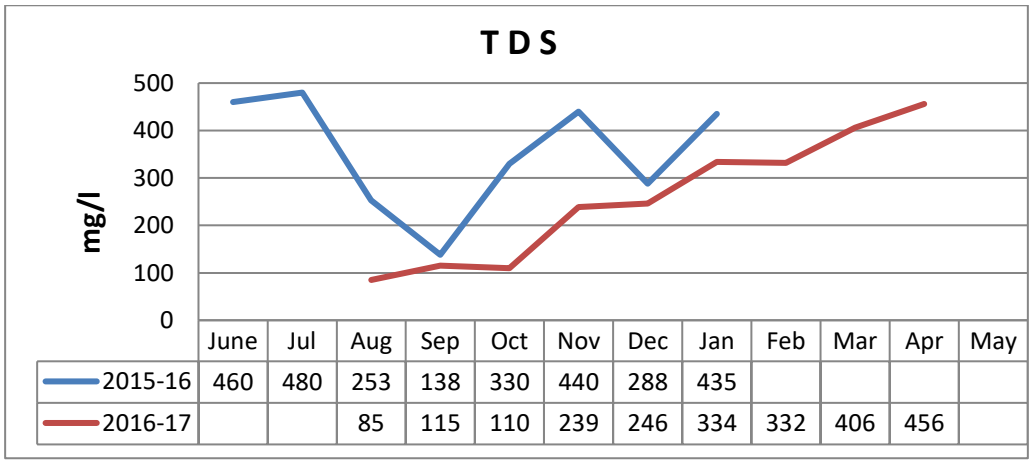
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	7.9	7.5	7.2	7.6	7.6	7.6	7.9	7.4				
2016-17			7.2	7.6	7.9	7.7	7.9	7.9	7.9	7.8	7.4	

Note:- The blank values indicates no flow in the river.



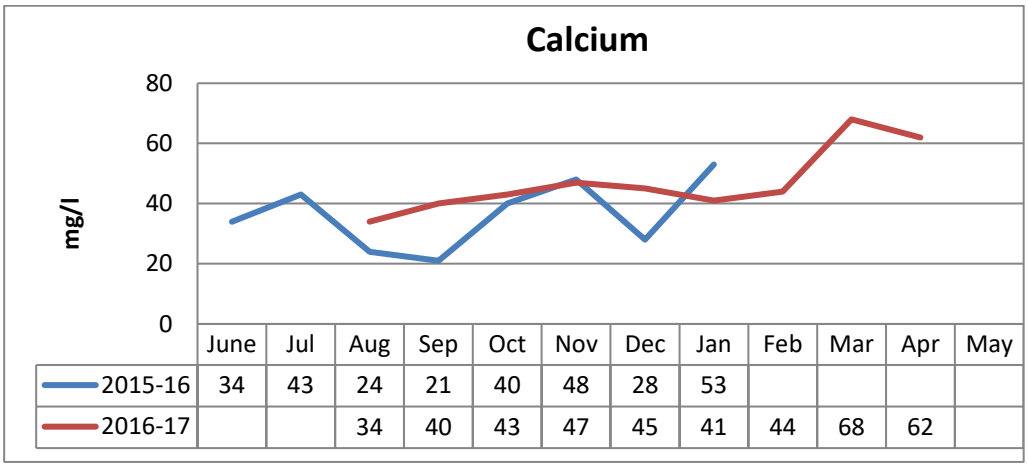
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	768	794	422	228	549	726	479	725				
2016-17			138	232	212	477	482	648	664	810	908	

Note:- The blank values indicates no flow in the river.



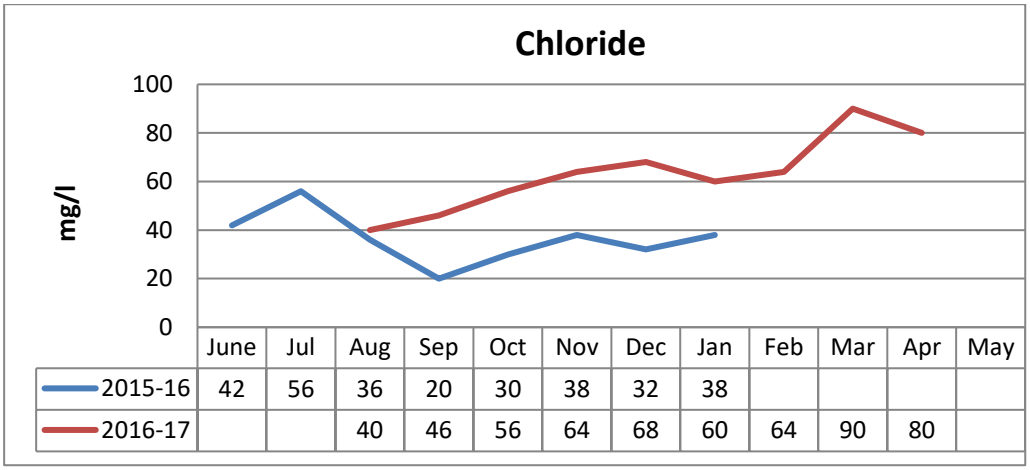
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	460	480	253	138	330	440	288	435				
2016-17			85	115	110	239	246	334	332	406	456	

Note:- The blank values indicates no flow in the river.



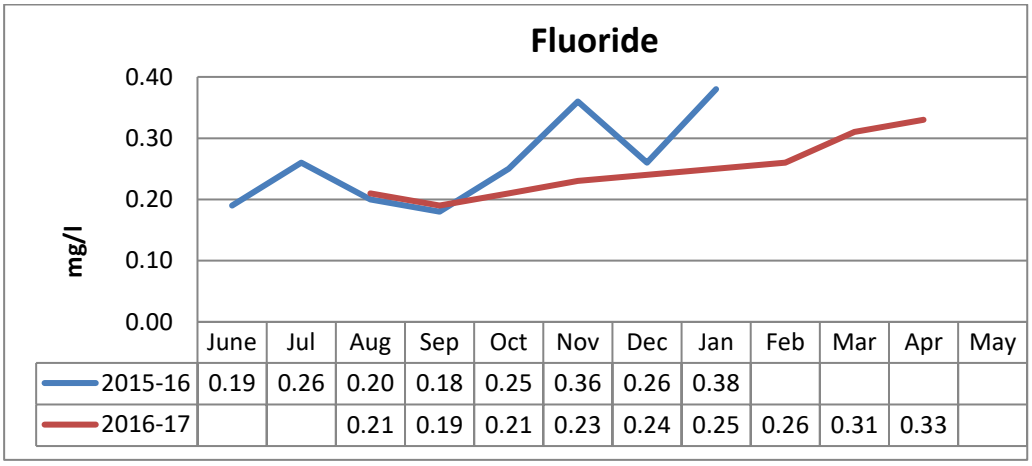
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	34	43	24	21	40	48	28	53				
2016-17			34	40	43	47	45	41	44	68	62	

Note:- The blank values indicates no flow in the river.



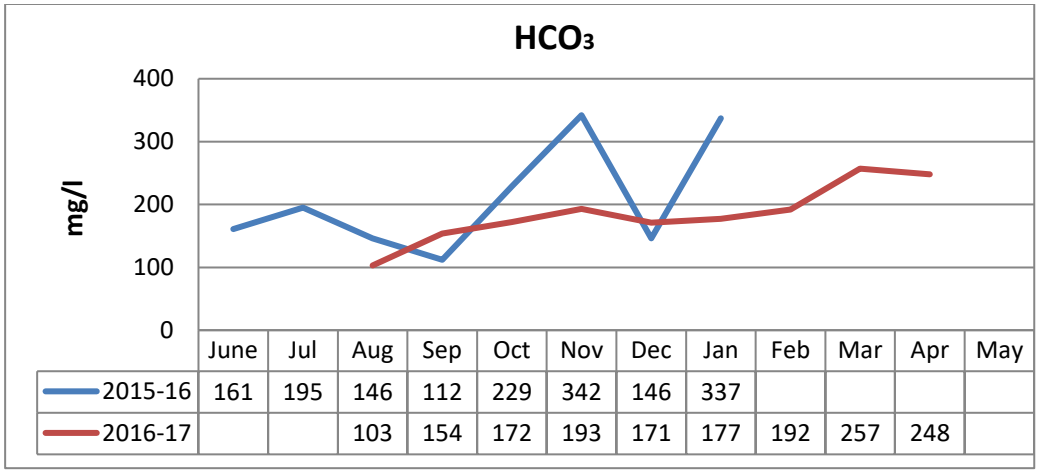
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	42	56	36	20	30	38	32	38				
2016-17			40	46	56	64	68	60	64	90	80	

Note:- The blank values indicates no flow in the river.



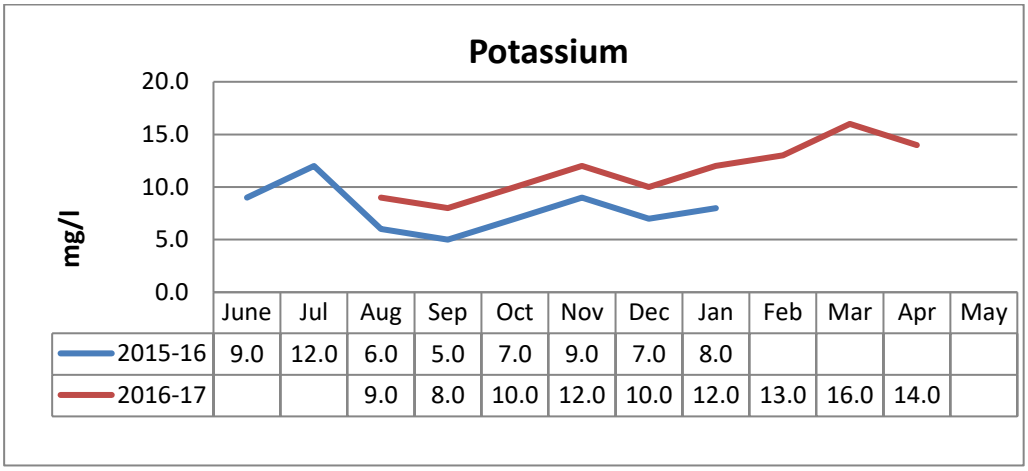
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	0.19	0.26	0.20	0.18	0.25	0.36	0.26	0.38				
2016-17			0.21	0.19	0.21	0.23	0.24	0.25	0.26	0.31	0.33	

Note:- The blank values indicates no flow in the river.



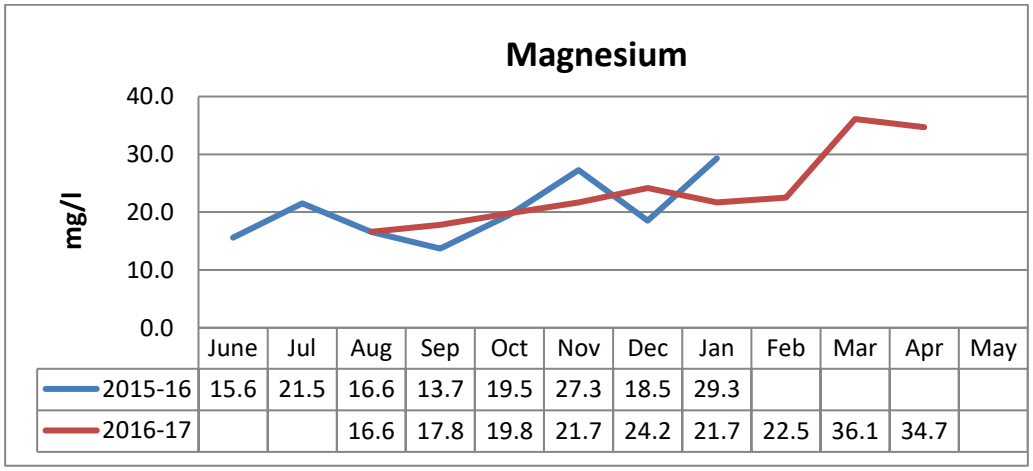
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	161	195	146	112	229	342	146	337				
2016-17			103	154	172	193	171	177	192	257	248	

Note:- The blank values indicates no flow in the river.



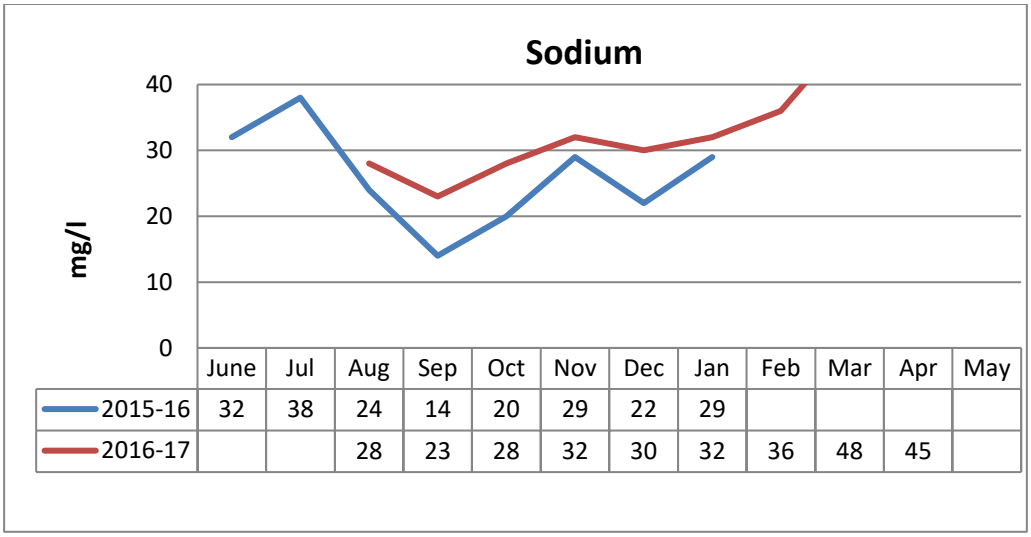
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	9.0	12.0	6.0	5.0	7.0	9.0	7.0	8.0				
2016-17			9.0	8.0	10.0	12.0	10.0	12.0	13.0	16.0	14.0	

Note:- The blank values indicates no flow in the river.

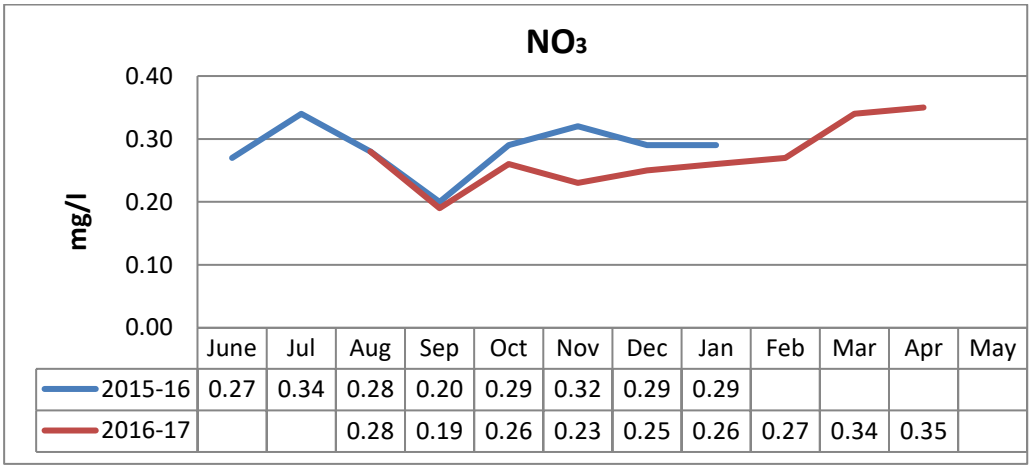


	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	15.6	21.5	16.6	13.7	19.5	27.3	18.5	29.3				
2016-17			16.6	17.8	19.8	21.7	24.2	21.7	22.5	36.1	34.7	

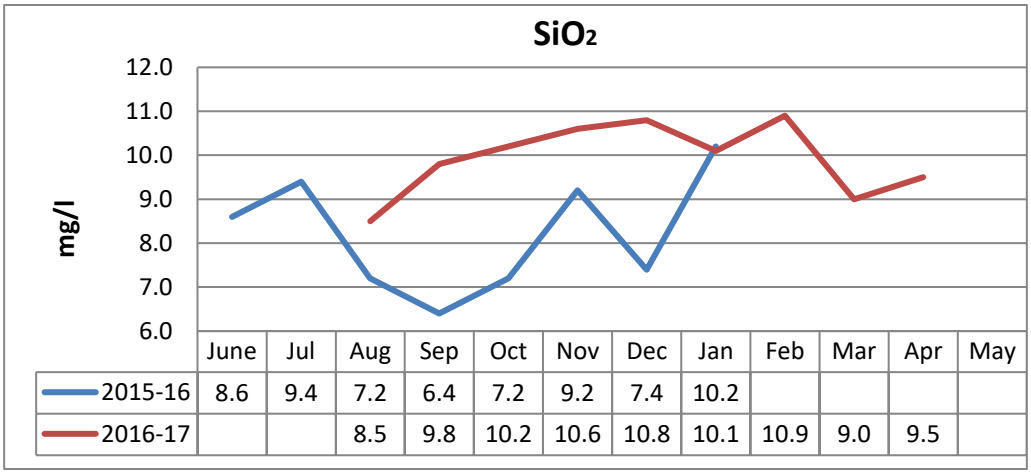
Note:- The blank values indicates no flow in the river.



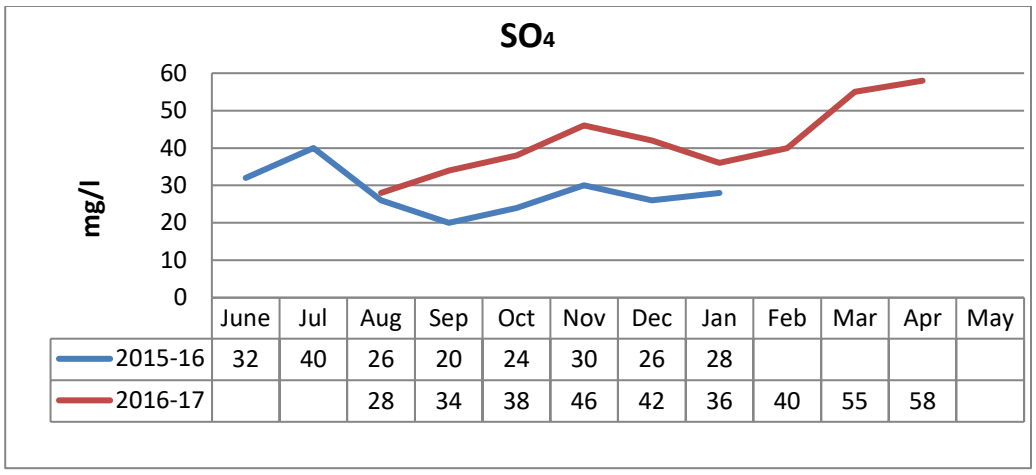
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	32	38	24	14	20	29	22	29				
2016-17			28	23	28	32	30	32	36	48	45	



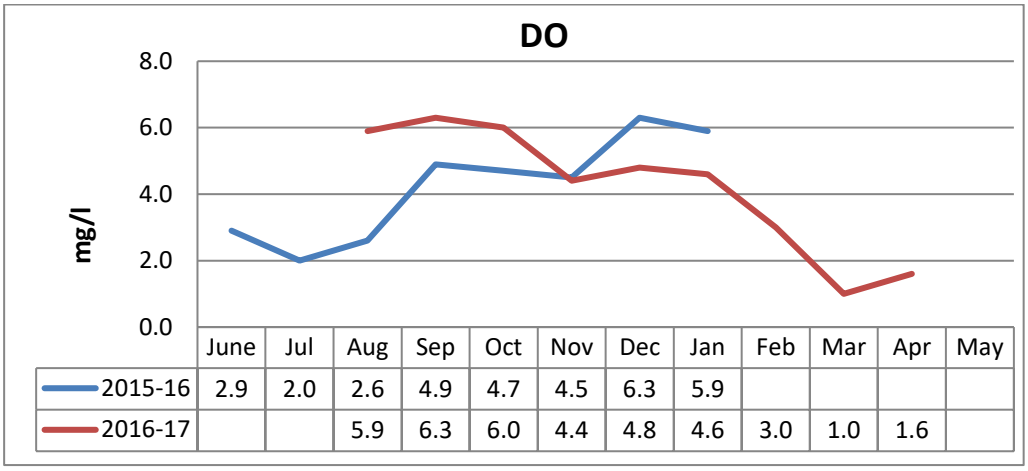
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	0.27	0.34	0.28	0.20	0.29	0.32	0.29	0.29				
2016-17			0.28	0.19	0.26	0.23	0.25	0.26	0.27	0.34	0.35	



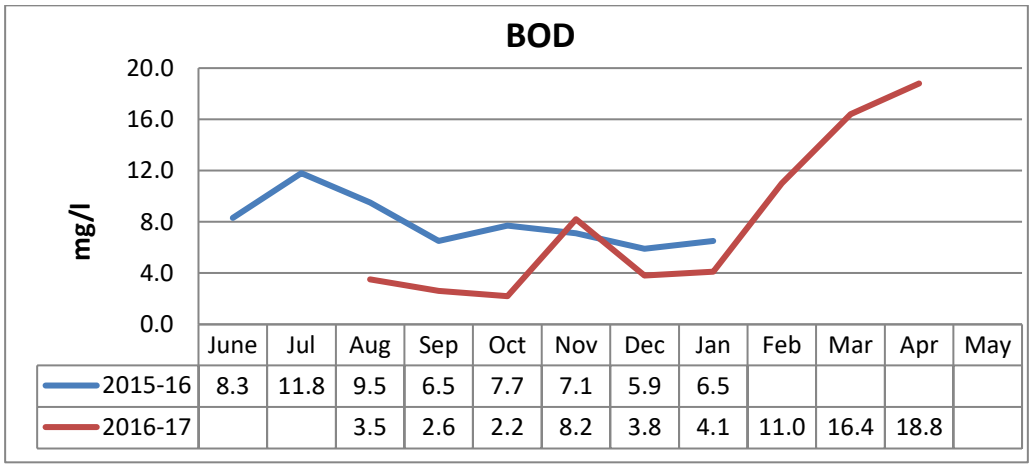
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	8.6	9.4	7.2	6.4	7.2	9.2	7.4	10.2				
2016-17			8.5	9.8	10.2	10.6	10.8	10.1	10.9	9.0	9.5	



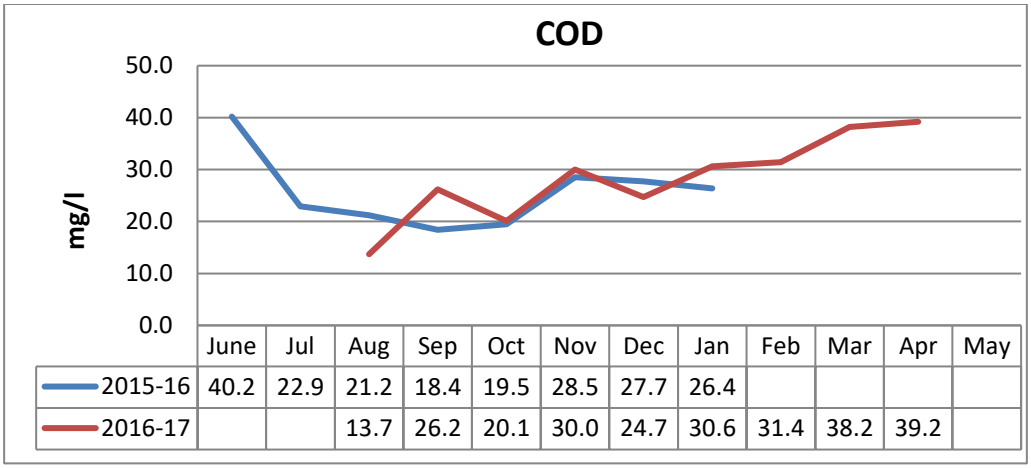
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	32	40	26	20	24	30	26	28				
2016-17			28	34	38	46	42	36	40	55	58	



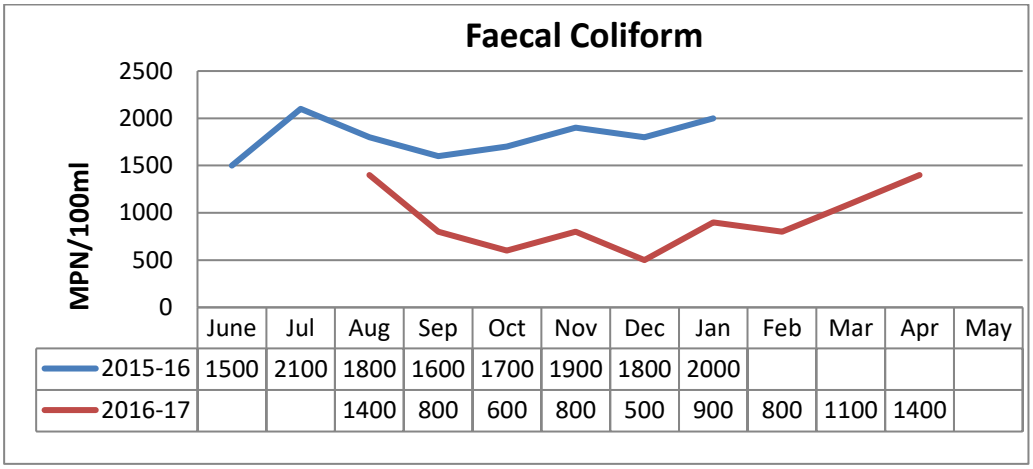
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	2.9	2.0	2.6	4.9	4.7	4.5	6.3	5.9				
2016-17			5.9	6.3	6.0	4.4	4.8	4.6	3.0	1.0	1.6	



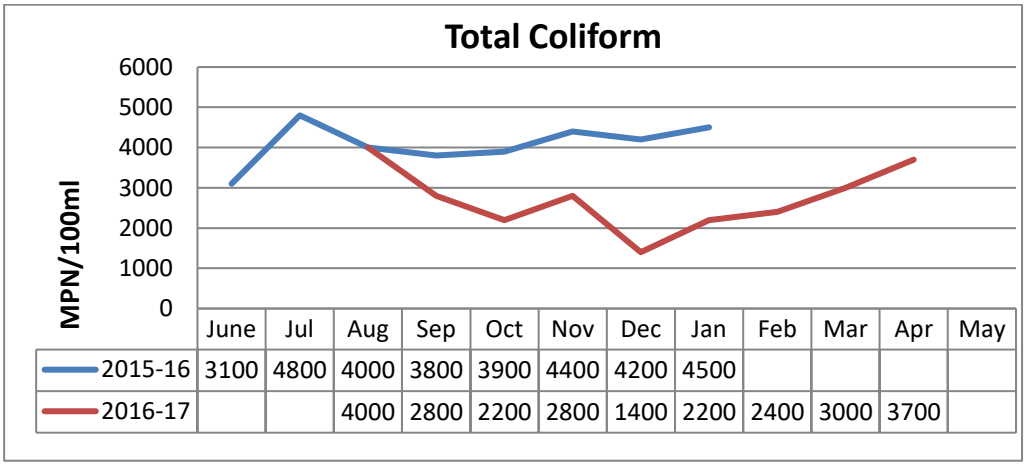
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	8.3	11.8	9.5	6.5	7.7	7.1	5.9	6.5				
2016-17			3.5	2.6	2.2	8.2	3.8	4.1	11.0	16.4	18.8	



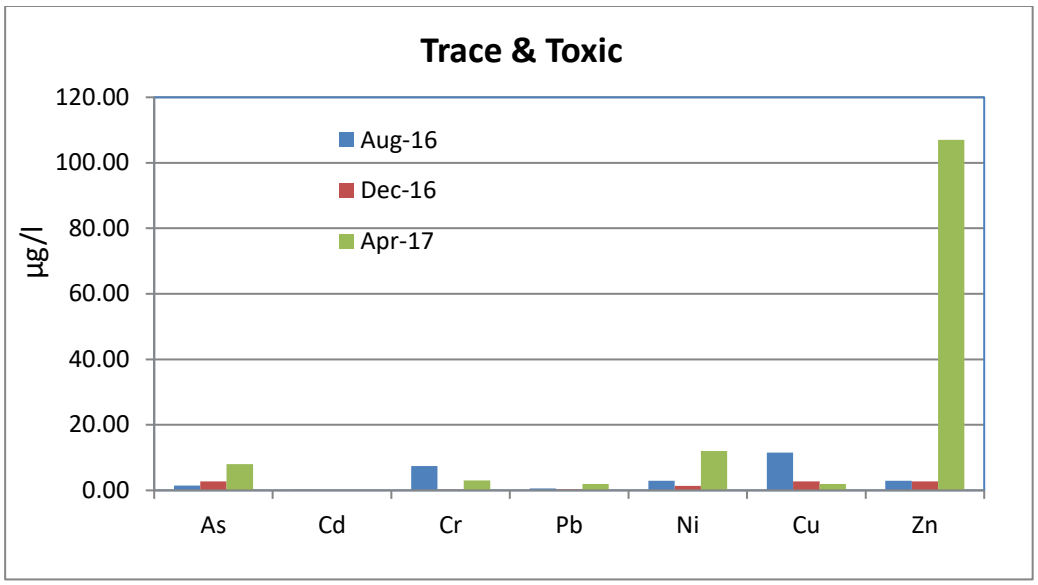
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	40.2	22.9	21.2	18.4	19.5	28.5	27.7	26.4				
2016-17			13.7	26.2	20.1	30.0	24.7	30.6	31.4	38.2	39.2	

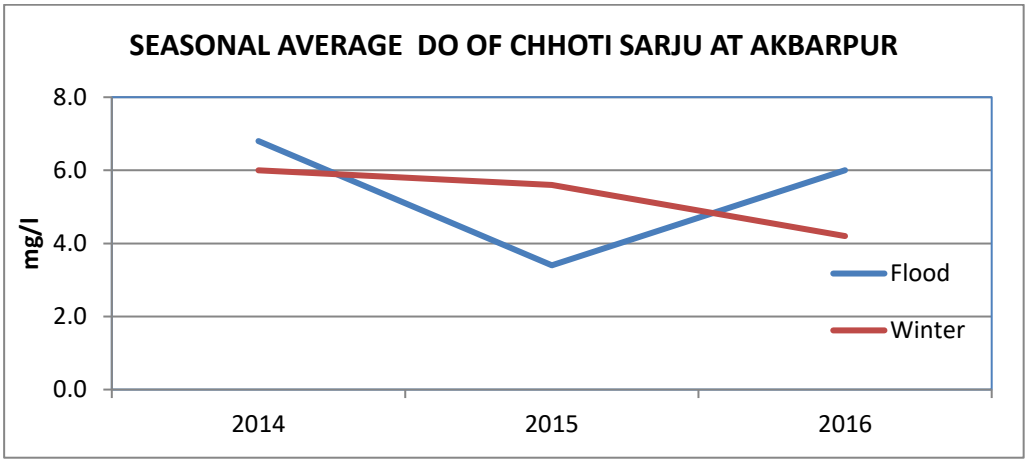


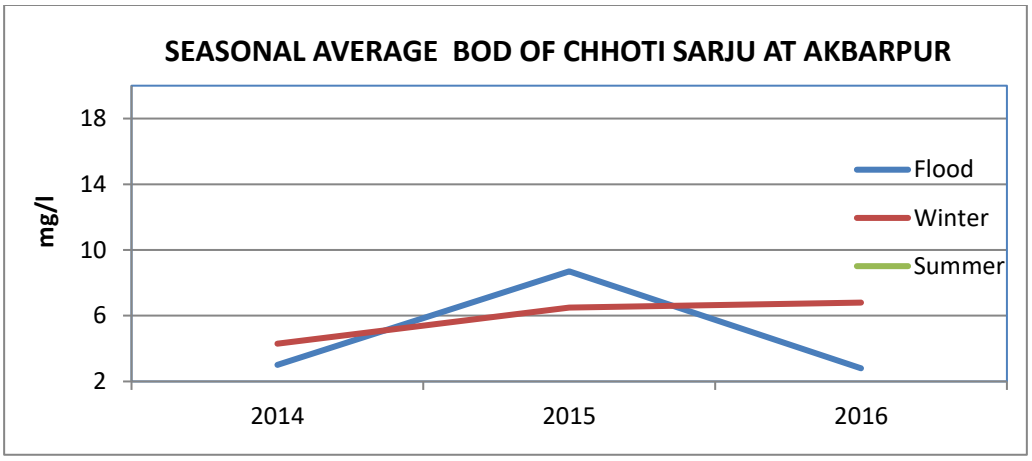
	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	1500	2100	1800	1600	1700	1900	1800	2000				
2016-17			1400	800	600	800	500	900	800	1100	1400	



	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	3100	4800	4000	3800	3900	4400	4200	4500				
2016-17			4000	2800	2200	2800	1400	2200	2400	3000	3700	


Trace & Toxic
120.00
100.00
80.00
60.00
40.00
20.00
0.00
µg/l
Aug-16
Dec-16
Apr-17
As
Cd
Cr
Pb
Ni
Cu
Zn


SEASONAL AVERAGE DO OF CHHOTI SARJU AT AKBARPUR
8.0
6.0
4.0
2.0
0.0
mg/l
Flood
Winter
2014
2015
2016


SEASONAL AVERAGE BOD OF CHHOTI SARJU AT AKBARPUR
18
14
10
6
2
mg/l
Flood
Winter
Summer
2014
2015
2016

5. General Remark / Conclusion about W.Q. trend:

I. Meja Road on River Tons: This is the only water quality monitoring station on river Tons.

- During the year 2016-17 the maximum BOD observed was 2.8 mg/l and the yearly mean was 2.1 mg/l. The dissolved oxygen(DO) content was in the range of 5.7 mg/l to 8.0 mg/l. The Faecal coliform range was 500-1200 MPN and Total Coliform fell in between 1400 to 2600 MPN. All other parameters including trace and toxic were within the permissible range.
- From the historical data it can be gathered that the values of BOD in all years was either equal to or less than 3.0 mg/l except in the year 2011 when it was on average more than 3.0 mg/l. The Dissolved oxygen average values have been above 7.0 mg/l. The Faecal and Total coliform values shows a steady increasing trend in all years & all seasons is a matter of concern. The quality of water at this station is relatively Good except the presence of high Faecal and Total coliform values.

II. Akbarpur on River Choti Saryu: This is also the lone water quality station on river Choti Saryu.

- In the year 2016-17 , the maximum BOD values observed was 18.8 mg/l during summer season and minimum being 2.2 in flood season. The DO values ranged between 1.0 to 6.3 mg/l. The Faecal coliform range was 500-3700 MPN and Total Coliform fell in between 1100 to 4000 MPN. All other parameters including trace and toxic were within the permissible range.
- The water quality monitoring at this station started from 2014. Due to negligible flow in summer season and the sewage of Akbarpur town the BOD values during summer are in general very high. The Faecal and Total Coliform values are also above the permissible limits through out the year with peak values observed during post & pre-monsoon season.

History Sheet

And

WQ Data

HISTORY SHEET

			Water Year	:	**2016-2017**
Site	:	**MEJA ROAD**	**Code**	:	**GGZOOB4**
State	:	Uttar Pradesh	District		Allahabad
Basin	:	Ganga-Brahm-Meghna Basin	Independent River	:	Ganga
Tributary	:	-	Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Tons
Division	:	M Ganga Div. III, Varanasi	Sub-Division	:	M Ganga Yamuna SD, Allahabad
Drainage Area	:	17388 Sq. Km.	Bank	:	Right
Latitude	:	25°14'14"	Longitude	:	82°02'02"
		Opening Date	Closing Date		
Gauge	:	4/1/1960			
Discharge	:	4/1/1960			
Sediment	:				
Water Quality	:	7/14/1976			

S.No	Parameters	6/1/2016	7/1/2016	8/1/2016	9/1/2016	10/1/2016	11/1/2016	12/1/2016	1/2/2017	2/1/2017	3/1/2017	4/1/2017	5/1/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	30.90	29.56	450.7	521.2	1338	158.2	111.8	100.3	99.82	103.8	105.9	66.60
2	Colour_Cod (-)	Clear	Clear	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Clear	Clear
3	EC_FLD (µmho/cm)	220	242	190	180	199	298	260	248	214	205	220	210
4	EC_GEN (µmho/cm)	226	248	194	183	202	302	264	252	216	208	224	220
5	Odour_Code (-)	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
6	pH_FLD (pH units)	8.1	8.2	8.0	7.7	8.0	8.1	8.2	8.1	8.0	7.9	8.0	8.0
7	pH_GEN (pH units)	8.0	8.1	7.8	7.6	7.9	8.0	8.1	7.8	8.0	7.8	7.9	8.0
8	TDS (mg/L)	142	150	120	109	110	151	138	128	108	105	112	127
9	Temp (deg C)	25.0	24.0	25.0	24.0	24.0	21.0	17.0	17.0	21.0	22.0	24.0	26.0
10	Turb (NTU)	1.2	2.9	4.7	4.1	3.6	2.4	1.3	0.7	0.6	0.4	0.2	0.1
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	145	94	76	84	88	88	94	100	103	106	100	112
3	B (mg/L)	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03
4	Ca (mg/L)	38	44	52	60	56	58	53	48	46	45	48	41
5	Cl (mg/L)	26.0	28.0	34.0	30.0	32.0	36.0	30.0	26.0	24.0	28.0	28.0	24.0
6	CO3 (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	F (mg/L)	0.25	0.24	0.23	0.21	0.22	0.23	0.22	0.23	0.23	0.24	0.24	0.23
8	Fe (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	HCO3 (mg/L)	177	115	93	102	107	107	114	122	126	130	122	137
10	K (mg/L)	7.0	6.0	6.0	5.0	6.0	7.0	6.0	8.0	8.0	9.0	9.0	8.0
11	Mg (mg/L)	20.3	12.4	9.6	8.5	9.9	10.3	12.4	14.5	12.4	14.5	14.9	11.4
12	Na (mg/L)	14.0	11.0	9.0	10.0	11.0	13.0	11.0	14.0	12.0	14.0	15.0	14.0
13	NH3-N (mg N/L)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
14	NO2+NO3 (mg N/L)	0.29	0.28	0.28	0.20	0.20	0.21	0.23	0.25	0.26	0.26	0.27	0.28
15	NO2-N (mgN/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	NO3-N (mgN/L)	0.29	0.28	0.28	0.20	0.20	0.21	0.23	0.25	0.26	0.26	0.27	0.28
17	P-Tot (mgP/L)	0.022	0.021	0.016	0.012	0.014	0.018	0.022	0.018	0.020	0.024	0.021	0.019
18	SiO2 (mg/L)	8.2	8.4	8.3	9.1	9.5	9.8	9.7	9.2	9.4	9.2	9.3	8.7
19	SO4 (mg/L)	17.0	15.0	14.0	18.0	17.0	20.0	18.0	16.0	15.0	17.0	16.0	26.0
	BIOLOGICAL/BACTERIOLOGICAL												

Station Name : MEJA ROAD (GGZOOB4) | **Water Quality Datasheet for the period : 2016-2017** | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **River Water Analysis** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	6/1/2016	7/1/2016	8/1/2016	9/1/2016	10/1/2016	11/1/2016	12/1/2016	1/2/2017	2/1/2017	3/1/2017	4/1/2017	5/1/2017
		A	A	A	A	A	A	A	A	A	A	A	A
1	BOD3-27 (mg/L)	2.4	2.5	2.4	1.8	1.5	1.8	2.4	2.1	2.2	1.2	2.8	1.8
2	COD (mg/L)	10.1	13.2	7.9	8.9	19.4	15.6	17.6	21.2	18.2	20.0	26.4	19.6
3	DO (mg/L)	6.9	7.1	6.7	6.5	7.5	7.5	7.3	8.0	6.7	6.3	5.7	6.1
4	DO_SAT% (%)	84	85	81	77	89	84	76	83	75	72	68	75
5	FCol-MPN (MPN/100mL)	1000	1200	700	500	600	500	600	500	600	600	800	650
6	Tcol-MPN (MPN/100mL)	2500	2600	2400	1800	2000	1600	1800	1400	1600	1800	2100	1800
	TRACE & TOXIC												
1	As (µg/L)			2.8								2.0	
2	Cd (µg/L)			1.1								0.0	
3	Cr (µg/L)			9.4								3.0	
4	Ni (µg/L)			2.76								8.0	
5	Pb (µg/L)			3.90								1.0	
6	Zn (µg/L)			2.76								38.0	
7	Cu (µg/L)			16.26								2.0	
	CHEMICAL INDICES												
1	HAR_Ca (mgCaCO3/L)	95	110	131	149	141	146	133	120	116	112	120	103
2	HAR_Total (mgCaCO3/L)	179	161	171	184	182	189	185	181	168	172	182	150
3	Na% (%)	14	12	10	10	11	13	11	14	13	14	14	16
4	RSC (-)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	0.5	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5
	PESTICIDES												

Water Quality Datasheet for the period : 2016-2017

Station Name : MEJA ROAD (GGZOOB4) **Division : M Ganga Div. III, Varanasi**

Local River : Tons **Well Water Analysis** **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	11/1/2016	5/1/2017
		B	B
	PHYSICAL		
1	Colour_Cod (-)	Clear	Clear
2	EC_FLD (µmho/	2045	2040
3	EC_GEN (µmho	2052	2048
4	Odour_Code (-)	odour free	odour free
5	pH_FLD (pH uni	7.4	7.5
6	pH_GEN (pH un	7.3	7.5
7	TDS (mg/L)	1035	1167
8	Temp (deg C)	20.0	22.5
	CHEMICAL		
1	Alk-Phen (mgCa	0.0	0.0
2	ALK-TOT (mgCa	318	352
3	B (mg/L)	0.04	0.04
4	Ca (mg/L)	117	110
5	Cl (mg/L)	224.0	186.0
6	CO3 (mg/L)	0.0	0.0
7	F (mg/L)	0.51	0.51
8	Fe (mg/L)	0.3	0.3
9	HCO3 (mg/L)	388	429
10	K (mg/L)	16.0	18.0
11	Mg (mg/L)	60.9	56.8
12	Na (mg/L)	128.0	117.0
13	NH3-N (mg N/L	0.05	0.05
14	NO2+NO3 (mg	2.01	1.80
15	NO2-N (mgN/L)	0.12	0.10
16	NO3-N (mgN/L)	1.89	1.71
17	P-Tot (mgP/L)	0.286	0.272
18	SiO2 (mg/L)	10.6	10.8
19	SO4 (mg/L)	88.0	97.0
	BIOLOGICAL/BACTERIOLOGICAL		
	TRACE & TOXIC		
	CHEMICAL INDICES		
1	HAR_Ca (mgCa	292	275
2	HAR_Total (mg	546	512
3	Na% (%)	33	32
4	RSC (-)	0.0	0.0
5	SAR (-)	2.4	2.3
	PESTICIDES		

Water Quality Summary for the period : 2016-2017

Station Name : MEJA ROAD (GGZOOB4) **River Water Summary** **Division : M Ganga Div. III, Varanasi**

Local River : Tons **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)	12	1338	29.56	259.8
2	EC_FLD (µmho/cm)	12	298	180	224
3	EC_GEN (µmho/cm)	12	302	183	228
4	pH_FLD (pH units)	12	8.2	7.7	8
5	pH_GEN (pH units)	12	8.1	7.6	7.9
6	TDS (mg/L)	12	151	105	125
7	Temp (deg C)	12	26.0	17.0	22.5
8	Turb (NTU)	12	4.7	0.1	1.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	12	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	12	145	76	99
3	B (mg/L)	12	0.03	0.02	0.03
4	Ca (mg/L)	12	60	38	49
5	Cl (mg/L)	12	36.0	24.0	28.8
6	CO3 (mg/L)	12	0.0	0.0	0
7	F (mg/L)	12	0.25	0.21	0.23
8	Fe (mg/L)	12	0.0	0.0	0
9	HCO3 (mg/L)	12	177	93	121
10	K (mg/L)	12	9.0	5.0	7.1
11	Mg (mg/L)	12	20.3	8.5	12.6
12	Na (mg/L)	12	15.0	9.0	12.3
13	NH3-N (mg N/L)	12	0.05	0.05	0.05
14	NO2+NO3 (mg N/L)	12	0.29	0.20	0.25
15	NO2-N (mgN/L)	12	0.00	0.00	0
16	NO3-N (mgN/L)	12	0.29	0.20	0.25
17	P-Tot (mgP/L)	12	0.024	0.012	0.019
18	SiO2 (mg/L)	12	9.8	8.2	9.1
19	SO4 (mg/L)	12	26.0	14.0	17.4
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	12	2.8	1.2	2.1
2	COD (mg/L)	12	26.4	7.9	16.5
3	DO (mg/L)	12	8.0	5.7	6.9
4	DO_SAT% (%)	12	89	68	79
5	FCol-MPN (MPN/100mL)	12	1200	500	688
6	Tcol-MPN (MPN/100mL)	12	2600	1400	1950
	TRACE & TOXIC				
1	As (µg/L)	2	2.00	0.28	1.14
2	Cd (µg/L)	2	0.11	0.00	0.05
3	Cr (µg/L)	2	3.00	0.94	1.97
4	Ni (µg/L)	2	8.00	2.76	5.38
5	Cu (µg/L)	2	16.26	2.00	9.13
6	Pb (µg/L)	2	1.00	0.39	0.70
7	Zn (µg/L)	2	38.00	2.76	20.38

	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	12	149	95	123
2	HAR_Total (mgCaCO3/L)	12	189	150	175
3	Na% (%)	12	16	10	13
4	RSC (-)	12	0.0	0.0	0
5	SAR (-)	12	0.5	0.3	0.4
	PESTICIDES				

Water Quality Summary for the period : 2016-2017

Station Name : MEJA ROAD (GGZOOB4) **Well Water Summary** **Division : M Ganga Div. III, Varanasi**

Local River : Tons **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	EC_FLD (µmho/cm)	2	2045	2040	2043
2	EC_GEN (µmho/cm)	2	2052	2048	2050
3	pH_FLD (pH units)	2	7.5	7.4	7.5
4	pH_GEN (pH units)	2	7.5	7.3	7.4
5	TDS (mg/L)	2	1167	1035	1101
6	Temp (deg C)	2	22.5	20.0	21.3
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	2	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	2	352	318	335
3	B (mg/L)	2	0.04	0.04	0.04
4	Ca (mg/L)	2	117	110	114
5	Cl (mg/L)	2	224.0	186.0	205.0
6	CO3 (mg/L)	2	0.0	0.0	0.0
7	F (mg/L)	2	0.51	0.51	0.51
8	Fe (mg/L)	2	0.3	0.3	0.3
9	HCO3 (mg/L)	2	429	388	409
10	K (mg/L)	2	18.0	16.0	17.0
11	Mg (mg/L)	2	60.9	56.8	58.8
12	Na (mg/L)	2	128.0	117.0	122.5
13	NH3-N (mg N/L)	2	0.05	0.05	0.05
14	NO2+NO3 (mg N/L)	2	2.01	1.80	1.91
15	NO2-N (mgN/L)	2	0.12	0.10	0.11
16	NO3-N (mgN/L)	2	1.89	1.71	1.80
17	P-Tot (mgP/L)	2	0.286	0.272	0.279
18	SiO2 (mg/L)	2	10.8	10.6	10.7
19	SO4 (mg/L)	2	97.0	88.0	92.5
	BIOLOGICAL/BACTERIOLOGICAL				
	TRACE & TOXIC				
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	2	292	275	284
2	HAR_Total (mgCaCO3/L)	2	546	512	529
3	Na% (%)	2	33	32	33
4	RSC (-)	2	0.0	0.0	0.0
5	SAR (-)	2	2.4	2.3	2.3
	PESTICIDES				

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **River Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Flood									
		Jun - Oct									
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	PHYSICAL										
1	Q (cumec)	231.3	466.5	167.0	178.7	340.4	337.8	517.4	278.7	245.8	474.1
2	EC_FLD (µmho/cm)	228	206	293	156	190	192	210	226	250	206
3	EC_GEN (µmho/cm)	216	198	288	152	184	186	204	220	255	211
4	pH_FLD (pH units)	7.5	7.8	7.9	8.0	8.3	7.7	7.8	7.9	7.9	8.0
5	pH_GEN (pH units)	8.1	8.2	8.2	8.1	8.6	7.9	7.9	7.9	7.9	7.9
6	TDS (mg/L)			155	77	96	133	133	127	153	126
7	Temp (deg C)	30.6	27.8	26.0	28.9	27.9	28.8	27.8	23.8	25.6	24.4
8	Turb (NTU)			0.3	0.1	2.6			3.2	0.2	3.3
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	15.9	0.0	2.4	19.9	19.9	4.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	115	90	121	94	94	88	90	89	136	97
3	B (mg/L)	0.08	0.03	0.00	0.02	0.00	0.04	0.03	0.02	0.03	0.03
4	Ca (mg/L)	34	26	27	34	34	38	38	32	36	50
5	Cl (mg/L)	30.8	27.8	37.2	14.0	16.8	19.4	18.8	21.4	15.8	30.0
6	CO3 (mg/L)	19.2	0.0	2.9	24.0	24.0	4.8	0.0	0.0	0.0	0.0
7	F (mg/L)	0.14	0.10	0.39	0.61	0.34	0.51	0.47	0.34	0.34	0.23
8	Fe (mg/L)	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.1	0.0	0.0
9	HCO3 (mg/L)	86	110	142	66	66	98	110	109	166	119
10	K (mg/L)	5.2	7.5	3.6	4.6	6.0	7.0	7.0	5.8	6.0	6.0
11	Mg (mg/L)	11.4	9.1	11.8	10.0	14.9	16.3	16.5	16.4	15.3	12.1
12	Na (mg/L)	18.4	20.6	28.5	8.0	10.4	10.2	10.0	9.6	10.8	11.0
13	NH3-N (mg N/L)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.05
14	NO2+NO3 (mg N/L)	0.08	0.25	0.01	0.03	0.29	0.30	0.29	0.28	0.31	0.25
15	NO2-N (mgN/L)	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
16	NO3-N (mgN/L)	0.08	0.25	0.01	0.03	0.29	0.30	0.29	0.28	0.31	0.25
17	Org-N (mgN/L)	0.1		0.1	0.0						
18	P-Tot (mgP/L)	0.004	0.001	0.009	0.001	0.001	0.001	0.001	0.012	0.022	0.017
19	SiO2 (mg/L)	7.9	8.1	8.9	8.7	8.3	8.9	8.6	8.0	8.4	8.7
20	SO4 (mg/L)	10.4	15.5	11.5	7.9	12.6	14.4	14.4	13.6	15.8	16.2

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **River Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Flood									
		Jun - Oct									
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	BIOLOGICAL/BACTERIOLOGICAL										
1	BOD3-27 (mg/L)			2.2	2.2	3.6	2.8	2.8	2.5	2.5	2.1
2	COD (mg/L)	5.4		2.8	9.4	8.9	10.9	10.7	15.1	9.8	11.9
3	DO (mg/L)	7.1	6.9	7.3	7.1	7.6	7.2	7.1	7.1	7.1	6.9
4	DO_SAT% (%)	95	87	89	92	97	93	90	84	87	83
5	FCol-MPN (MPN/100mL)		120	218	200	220	220	220	400	440	800
6	Tcol-MPN (MPN/100mL)		560	460	860	960	920	820	1300	1480	2260
	TRACE & TOXIC										
1	As (µg/L)										2.8
2	Cd (µg/L)										1.1
3	Cr (µg/L)										9.4
4	Ni (µg/L)										2.76
5	Pb (µg/L)										3.90
6	Zn (µg/L)										2.76
7	Cu (µg/L)										16.26
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	84	64	67	85	86	96	94	80	91	125
2	HAR_Total (mgCaCO3/L)	132	102	117	127	148	163	163	149	155	176
3	Na% (%)	23	29	34	11	13	11	11	12	13	12
4	RSC (-)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	0.7	0.9	1.1	0.3	0.4	0.3	0.3	0.3	0.4	0.4
	PESTICIDES										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **River Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Winter									
		Nov - Feb									
		2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
	PHYSICAL										
1	Q (cumec)	67.81	113.0	51.19	58.80	130.3	125.8	217.5	194.8	45.44	117.5
2	EC_FLD (µmho/cm)	225	220	300	178	195	254	249	250	275	255
3	EC_GEN (µmho/cm)	216	208	295	171	188	247	242	242	268	259
4	pH_FLD (pH units)	6.2	7.8	7.7	8.2	8.3	8.1	8.0	8.0	6.5	8.1
5	pH_GEN (pH units)	6.6	8.3	8.0	8.4	8.5	8.3	8.3	8.1	7.8	8.0
6	TDS (mg/L)			178	87	120	161	161	145	162	131
7	Temp (deg C)	20.6	20.5	19.3	19.8	18.5	19.3	19.3	18.8	18.3	19.0
8	Turb (NTU)			0.1	0.1	0.1			2.7	0.4	1.3
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	5.0	2.5	2.0	10.0	10.0	5.0	5.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	145	124	126	92	83	94	94	103	143	96
3	B (mg/L)	0.16	0.03	0.00	0.01	0.02	0.03	0.03	0.03	0.02	0.03
4	Ca (mg/L)	35	30	27	31	35	36	36	36	36	52
5	Cl (mg/L)	27.0	33.4	42.2	19.5	17.0	18.5	18.5	19.5	16.0	29.0
6	CO3 (mg/L)	6.0	3.0	2.4	12.0	12.0	6.0	6.0	0.0	0.0	0.0
7	F (mg/L)	0.05	0.07	0.15	0.43	0.41	0.39	0.39	0.39	0.27	0.23
8	Fe (mg/L)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
9	HCO3 (mg/L)	107	145	149	88	77	103	103	126	174	117
10	K (mg/L)	6.3	5.6	2.0	5.0	6.3	7.0	6.8	6.8	5.5	7.3
11	Mg (mg/L)	12.8	15.7	13.0	10.2	14.3	15.9	16.2	15.7	15.1	12.4
12	Na (mg/L)	19.0	22.8	32.0	8.5	9.5	10.8	11.0	10.3	10.3	12.5
13	NH3-N (mg N/L)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.05
14	NO2+NO3 (mg N/L)	0.11	0.25	0.02	0.20	0.21	0.21	0.26	0.26	0.29	0.24
15	NO2-N (mgN/L)	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
16	NO3-N (mgN/L)	0.11	0.25	0.01	0.19	0.20	0.19	0.24	0.26	0.29	0.24
17	Org-N (mgN/L)	1.6		0.1	0.0						
18	P-Tot (mgP/L)	0.020	0.001	0.025	0.001	0.001	0.007	0.007	0.018	0.019	0.019
19	SiO2 (mg/L)	8.2	8.8	9.1	8.7	8.3	7.8	7.1	8.2	7.8	9.5
20	SO4 (mg/L)	11.5	13.8	10.7	13.0	11.8	14.5	14.5	12.8	12.5	17.3

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **River Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Winter									
		Nov - Feb									
		2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
	BIOLOGICAL/BACTERIOLOGICAL										
1	BOD3-27 (mg/L)			2.3	2.8	2.9	2.7	2.7	2.7	2.4	2.1
2	COD (mg/L)	2.1		4.1	9.5	6.8	12.8	12.8	13.4	11.8	18.2
3	DO (mg/L)	8.0	7.8	8.1	8.0	7.7	7.6	7.6	7.4	7.2	7.4
4	DO_SAT% (%)	88	87	87	87	82	82	82	80	76	80
5	FCol-MPN (MPN/100mL)		55	195	175	125	275	275	250	450	550
6	Tcol-MPN (MPN/100mL)		350	333	575	650	875	1075	925	1275	1600
	TRACE & TOXIC										
1	As (µg/L)										
2	Cd (µg/L)										
3	Cr (µg/L)										
4	Ni (µg/L)										
5	Pb (µg/L)										
6	Zn (µg/L)										
7	Cu (µg/L)										
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	87	75	67	76	88	90	90	90	90	129
2	HAR_Total (mgCaCO3/L)	140	140	121	119	148	156	157	156	153	181
3	Na% (%)	22	25	36	13	12	12	13	12	12	13
4	RSC (-)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	0.7	0.8	1.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
	PESTICIDES										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **River Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Summer									
		Mar - May									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	PHYSICAL										
1	Q (cumec)	61.60	64.90	51.69	51.90	67.83	115.2	130.6	159.3	33.99	92.10
2	EC_FLD (µmho/cm)	235	268	259	170	203	253	252	253	273	212
3	EC_GEN (µmho/cm)	223	261	252	166	193	244	241	248	266	217
4	pH_FLD (pH units)	8.1	7.7	8.2	8.6	8.4	8.2	8.1	7.9	7.8	8.0
5	pH_GEN (pH units)	8.6	8.1	8.4	8.9	8.6	8.4	8.4	8.0	7.9	7.9
6	TDS (mg/L)			149	90	98	165	151	152	161	115
7	Temp (deg C)	24.2	21.0	23.3	22.5	24.0	20.8	20.2	23.0	22.0	24.0
8	Turb (NTU)			0.1	0.1	0.1			1.6	0.8	0.2
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	0.0	0.0	9.7	0.0	19.9	10.0	6.6	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	124	125	147	77	93	99	98	132	140	106
3	B (mg/L)		0.00	0.01	0.03	0.03	0.04	0.03	0.03	0.03	0.03
4	Ca (mg/L)	31	32	41	49	36	36	35	37	36	45
5	Cl (mg/L)	18.7	63.2	42.0	18.0	20.7	20.0	21.3	18.0	17.7	26.7
6	CO3 (mg/L)	0.0	0.0	11.7	0.0	24.0	12.0	8.0	0.0	0.0	0.0
7	F (mg/L)		0.06	0.37	0.39	0.42	0.41	0.40	0.39	0.25	0.24
8	Fe (mg/L)		0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.1	0.0
9	HCO3 (mg/L)	114	153	155	94	65	96	104	161	171	129
10	K (mg/L)	6.0	4.3	4.9	5.3	7.7	7.7	6.7	6.7	5.7	8.7
11	Mg (mg/L)	12.9	16.1	11.1	13.9	15.7	16.7	16.4	15.6	14.6	13.6
12	Na (mg/L)	18.3	39.1	32.2	7.7	13.0	12.3	10.3	11.7	12.0	14.3
13	NH3-N (mg N/L)		0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.02	0.05
14	NO2+NO3 (mg N/L)		0.29	0.01	1.64	0.33	0.31	0.27	0.33	0.26	0.27
15	NO2-N (mgN/L)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	NO3-N (mgN/L)		0.29	0.01	1.64	0.33	0.31	0.27	0.33	0.26	0.27
17	Org-N (mgN/L)	0.0		0.0	0.0						
18	P-Tot (mgP/L)		0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.018	0.021
19	SiO2 (mg/L)		9.1	9.1	9.0	8.6	8.5	8.7	8.8	7.6	9.1
20	SO4 (mg/L)	13.7	9.1	11.7	15.9	11.7	13.0	13.0	16.7	15.7	19.7

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **River Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Summer									
		Mar - May									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	BIOLOGICAL/BACTERIOLOGICAL										
1	BOD3-27 (mg/L)			2.5	3.4	2.4	3.0	3.0	2.5	2.2	1.9
2	COD (mg/L)			6.9	6.7	7.0	11.5	11.5	16.5	9.4	22.0
3	DO (mg/L)	7.5	7.3	7.4	7.1	7.2	7.3	7.3	7.5	7.4	6.0
4	DO_SAT% (%)	89	82	87	82	86	82	80	88	84	72
5	FCol-MPN (MPN/100mL)		73	200	267	133	200	233	400	567	683
6	Tcol-MPN (MPN/100mL)		417	360	1033	633	733	1500	1467	1633	1900
	TRACE & TOXIC										
1	As (µg/L)					9.0	8.0	8.0	10.0	9.0	2.0
2	Cd (µg/L)					2.0	2.0	3.0	4.0	2.5	0.0
3	Cr (µg/L)					2.0	3.0	3.0	5.0	7.5	3.0
4	Ni (µg/L)					12.0	13.0	10.0	14.0	6.0	8.0
5	Pb (µg/L)					14.0	8.0	13.0	15.0	15.0	1.0
6	Zn (µg/L)					4.0	5.0	8.0	10.0	10.0	38.0
7	Cu (µg/L)										2.0
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	76	81	102	123	91	91	88	91	91	112
2	HAR_Total (mgCaCO3/L)	130	148	148	180	156	161	157	156	152	168
3	Na% (%)	23	36	32	9	15	14	12	13	14	15
4	RSC (-)	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	0.7	1.4	1.2	0.3	0.5	0.4	0.4	0.4	0.4	0.5
	PESTICIDES										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **Well Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Flood									
		Jun - Oct									
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	PHYSICAL										
1	EC_FLD (µmho/cm)	558	655	694	570						
2	EC_GEN (µmho/cm)	549	650	690	564						
3	pH_FLD (pH units)	7.9	7.3	7.7	7.7						
4	pH_GEN (pH units)	8.4	8.3	7.9	7.8						
5	TDS (mg/L)			404	283						
6	Temp (deg C)	25.4	24.0	24.9	24.1						
7	Turb (NTU)			0.1	0.1						
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	29.5	16.0	0.0	0.0						
2	ALK-TOT (mgCaCO3/L)	366	271	263	141						
3	B (mg/L)	0.10	0.04	0.11	0.00						
4	Ca (mg/L)	49	54	43	65						
5	Cl (mg/L)	46.0	81.2	37.2	35.5						
6	CO3 (mg/L)	35.5	19.3	0.0	0.0						
7	F (mg/L)	0.23	0.22	0.51	0.67						
8	Fe (mg/L)	0.3	0.1	0.1	0.3						
9	HCO3 (mg/L)	315	291	321	172						
10	K (mg/L)	7.2	8.3	5.6	6.8						
11	Mg (mg/L)	46.9	33.6	35.9	26.9						
12	Na (mg/L)	48.2	58.8	37.1	28.0						
13	NH3-N (mg N/L)	0.05	0.05	0.05	0.05						
14	NO2+NO3 (mg N/L)	0.63	0.35	0.56	1.42						
15	NO2-N (mgN/L)	0.06	0.03	0.17	0.18						
16	NO3-N (mgN/L)	0.57	0.32	0.39	1.23						
17	P-Tot (mgP/L)	0.021	0.007	0.039	0.004						
18	SiO2 (mg/L)	9.2	9.2	8.6	10.5						
19	SO4 (mg/L)	15.6	14.8	9.5	6.8						
	BIOLOGICAL/BACTERIOLOGICAL										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **Well Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Flood									
		Jun - Oct									
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	TRACE & TOXIC										
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	123	134	108	163						
2	HAR_Total (mgCaCO3/L)	318	274	258	275						
3	Na% (%)	23	31	23	17						
4	RSC (-)	0.1	0.2	0.2	0.0						
5	SAR (-)	1.2	1.6	1.0	0.7						
	PESTICIDES										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **Well Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Winter									
		Nov - Feb									
		2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
	PHYSICAL										
1	EC_FLD (µmho/cm)	476	730	688	590	585	600	556	620	2000	2045
2	EC_GEN (µmho/cm)	465	719	683	586	580	590	548	610	1996	2052
3	pH_FLD (pH units)	8.0	7.1	8.1	7.9	8.1	7.9	8.0	8.0	7.2	7.4
4	pH_GEN (pH units)	8.6	8.4	8.3	8.0	8.2	8.0	8.2	8.2	7.4	7.3
5	TDS (mg/L)			380	294	274	281	281	372	1200	1035
6	Temp (deg C)	23.3	21.9	20.0	20.8	23.5	27.0	25.0	21.0	22.5	20.0
7	Turb (NTU)			0.1	0.1	0.1					
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	24.9	15.6	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	470	274	318	132	120	120	120	172	404	318
3	B (mg/L)	0.11	0.06	0.05	0.04	0.03	0.03	0.03	0.03	0.04	0.04
4	Ca (mg/L)	53	59	52	63	59	60	60	60	123	117
5	Cl (mg/L)	45.3	63.7	41.9	38.0	36.0	38.0	38.0	70.0	240.0	224.0
6	CO3 (mg/L)	30.0	18.8	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	F (mg/L)	0.05	0.24	0.11	0.37	0.36	0.35	0.35	0.35	0.68	0.51
8	Fe (mg/L)	0.4	0.1	0.1	0.2	0.2	0.2	0.2	0.0	0.3	0.3
9	HCO3 (mg/L)	337	296	374	161	146	146	146	210	493	388
10	K (mg/L)	8.3	18.2	3.0	6.0	7.0	10.0	8.0	8.0	14.0	16.0
11	Mg (mg/L)	45.1	34.0	36.1	28.8	29.7	30.5	30.5	30.8	69.3	60.9
12	Na (mg/L)	59.8	41.5	38.9	40.3	38.0	40.0	38.0	39.0	144.0	128.0
13	NH3-N (mg N/L)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.05
14	NO2+NO3 (mg N/L)	0.24	0.39	0.27	1.93	1.44	1.41	1.41	1.39	2.33	2.01
15	NO2-N (mgN/L)	0.02	0.00	0.15	0.10	0.16	0.14	0.14	0.12	0.22	0.12
16	NO3-N (mgN/L)	0.22	0.39	0.12	1.83	1.28	1.27	1.27	1.26	2.11	1.89
17	P-Tot (mgP/L)	0.015	0.016	0.017	0.134	0.126	0.001	0.115	0.105	0.346	0.286
18	SiO2 (mg/L)	9.5	9.3	17.1	8.2	8.1	8.2	8.2	7.9	11.0	10.6
19	SO4 (mg/L)	21.5	17.8	6.6	13.3	16.0	9.2	9.2	60.0	96.0	88.0
	BIOLOGICAL/BACTERIOLOGICAL										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **Well Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Winter									
		Nov - Feb									
		2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
	TRACE & TOXIC										
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	133	148	131	159	147	149	149	149	309	292
2	HAR_Total (mgCaCO3/L)	321	290	281	279	271	276	276	278	597	546
3	Na% (%)	28	23	23	24	23	23	23	23	34	33
4	RSC (-)	0.2	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	1.5	1.1	1.0	1.1	1.0	1.1	1.0	1.0	2.6	2.4
	PESTICIDES										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **Well Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Summer									
		Mar - May									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	PHYSICAL										
1	EC_FLD (µmho/cm)	613	917	706	648	536	555	560	1620	1800	2040
2	EC_GEN (µmho/cm)	600	908	698	644	530	548	548	1611	1793	2048
3	pH_FLD (pH units)	7.5	7.3	8.0	7.8	8.2	8.0	8.0	7.6	7.2	7.5
4	pH_GEN (pH units)	8.0	8.4	8.2	8.0	8.3	8.2	8.2	7.8	7.3	7.4
5	TDS (mg/L)			386	322	298	296	296	970	1080	1167
6	Temp (deg C)	21.7	22.0	21.0	21.3	25.5	25.0	24.5	23.5	23.5	22.5
7	Turb (NTU)			0.1	0.1	0.1					
	CHEMICAL										
1	Alk-Phen (mgCaCO3/L)	23.2	19.9	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	ALK-TOT (mgCaCO3/L)	327	300	346	164	144	140	140	264	372	352
3	B (mg/L)		0.05	0.00	0.06	0.05	0.06	0.06	0.04	0.04	0.04
4	Ca (mg/L)	54	62	64	65	66	67	67	79	115	110
5	Cl (mg/L)	45.3	55.3	46.3	38.0	40.0	40.0	40.0	110.0	228.0	186.0
6	CO3 (mg/L)	28.0	24.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	F (mg/L)		0.10	0.05	0.24	0.26	0.26	0.26	0.56	0.59	0.50
8	Fe (mg/L)		0.1	0.2	0.3	0.9	0.9	0.7	0.6	0.3	0.3
9	HCO3 (mg/L)	342	317	398	200	176	171	170	322	454	429
10	K (mg/L)	7.0	11.7	4.9	7.0	9.0	10.0	10.0	11.0	11.0	18.0
11	Mg (mg/L)	44.5	41.2	40.4	38.1	33.0	32.8	32.8	42.9	64.4	56.8
12	Na (mg/L)	56.0	37.9	46.3	42.0	42.0	40.0	40.1	70.0	132.0	117.0
13	NH3-N (mg N/L)		0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.05
14	NO2+NO3 (mg N/L)		2.83	0.31	1.96	1.88	1.87	1.87	1.72	2.17	1.80
15	NO2-N (mgN/L)		0.00	0.08	0.00	0.00	0.00	0.00	0.18	0.21	0.09
16	NO3-N (mgN/L)		2.83	0.23	1.96	1.88	1.87	1.87	1.54	1.96	1.71
17	P-Tot (mgP/L)		0.001	0.001	0.001	0.132	0.126	0.126	0.244	0.322	0.272
18	SiO2 (mg/L)		9.0	11.2	8.3	8.3	8.3	8.3	10.4	10.2	10.8
19	SO4 (mg/L)	24.7	16.3	9.6	19.0	22.0	8.8	8.8	80.0	90.0	97.0
	BIOLOGICAL/BACTERIOLOGICAL										

Water Quality Seasonal Average for the period: 2007-2017

Station Name : MEJA ROAD (GGZOOB4) | **Division : M Ganga Div. III, Varanasi**

Local River : Tons | **Well Water** | **Sub-Division : M Ganga Yamuna SD, Allahabad**

S.No	Parameters	Summer									
		Mar - May									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	TRACE & TOXIC										
	CHEMICAL INDICES										
1	HAR_Ca (mgCaCO3/L)	135	155	160	163	164	167	167	196	289	275
2	HAR_Total (mgCaCO3/L)	320	326	329	321	302	303	303	375	557	512
3	Na% (%)	27	20	23	22	23	22	22	28	34	32
4	RSC (-)	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	SAR (-)	1.4	0.9	1.1	1.0	1.1	1.0	1.0	1.6	2.4	2.3
	PESTICIDES										

HISTORY SHEET

Water Year : 2016-2017

Site	**:**	**AKBARPUR**	**Code**	**:**	**GGVOOT6**
State	:	Uttar Pradesh	District		Ambedkar Nagar *
Basin	:	Ganga-Brahm-Meghna Basin	Independent River	:	Ganga
Tributary	:	Chhoti Sarju	Sub Tributary	:	
Sub-Sub Tributary	:		Local River	:	Chhoti Sarju
Division	:	M Ganga Div. III, Varanasi	Sub-Division	:	M Ganga - C Sarju SD, Varanasi
Drainage Area	:	800 Sq. Km.	Bank	:	Left
Latitude	:	26°26'00"	Longitude	:	82°32'00"
		Opening Date	Closing Date		
Gauge	:	7/3/1981			
Discharge	:	8/1/2014			
Sediment	:				
Water Quality	:	8/1/2014			

Water Quality Datasheet for the period : 2016-2017

Station Name : AKBARPUR (GGVOOT6) | **Division : M Ganga Div. III, Varanasi**

Local River : Choti Sarju | **River Water Analysis** | **Sub-Division : M Ganga - C Sarju SD, Varanasi**

S.No	Parameters	6/1/2016	7/1/2016	8/1/2016	9/1/2016	10/1/2016	11/1/2016	12/1/2016	1/2/2017	2/1/2017	3/1/2017	4/1/2017	5/1/2017
		A	A	A	A	A	A	A	A	A	A	A	A
	PHYSICAL												
1	Q (cumec)	0.000	0.000	11.65	5.705	11.95	1.358	0.384	0.362	0.220	0.158	0.146	0.000
2	Colour_Cod (-)	No flow	No flow	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear	Brown	Brown	No flow
3	EC_FLD (µmho/cm)			135	230	210	471	478	640	661	800	900	
4	EC_GEN (µmho/cm)			138	232	212	477	482	648	664	810	908	
5	Odour_Code (-)			odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	
6	pH_FLD (pH units)			7.3	7.7	8.0	7.8	8.0	8.0	8.1	7.9	7.4	
7	pH_GEN (pH units)			7.2	7.6	7.9	7.7	7.9	7.9	7.9	7.8	7.4	
8	TDS (mg/L)			85	115	110	239	246	334	332	406	456	
9	Temp (deg C)			30.0	33.0	30.0	26.0	21.0	14.0	15.0	18.0	23.0	
10	Turb (NTU)			4.9	3.6	2.7	1.8	1.3	1.1	0.3	0.2	0.1	
	CHEMICAL												
1	Alk-Phen (mgCaCO3/L)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	ALK-TOT (mgCaCO3/L)			85	126	141	158	140	145	158	210	204	
3	B (mg/L)			0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4	Ca (mg/L)			34	40	43	47	45	41	44	68	62	
5	Cl (mg/L)			40.0	46.0	56.0	64.0	68.0	60.0	64.0	90.0	80.0	
6	CO3 (mg/L)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7	F (mg/L)			0.21	0.19	0.21	0.23	0.24	0.25	0.26	0.31	0.33	
8	Fe (mg/L)			0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	
9	HCO3 (mg/L)			103	154	172	193	171	177	192	257	248	
10	K (mg/L)			9.0	8.0	10.0	12.0	10.0	12.0	13.0	16.0	14.0	
11	Mg (mg/L)			16.6	17.8	19.8	21.7	24.2	21.7	22.5	36.1	34.7	
12	Na (mg/L)			28.0	23.0	28.0	32.0	30.0	32.0	36.0	48.0	45.0	
13	NH3-N (mg N/L)			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
14	NO2+NO3 (mg N/L)			0.28	0.19	0.26	0.23	0.25	0.26	0.27	0.34	0.35	
15	NO2-N (mgN/L)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
16	NO3-N (mgN/L)			0.28	0.19	0.26	0.23	0.25	0.26	0.27	0.34	0.35	
17	P-Tot (mgP/L)			0.022	0.032	0.040	0.048	0.050	0.042	0.052	0.036	0.038	
18	SiO2 (mg/L)			8.5	9.8	10.2	10.6	10.8	10.1	10.9	9.0	9.5	

Water Quality Datasheet for the period : 2016-2017

Station Name : AKBARPUR (GGVOOT6) | **Division : M Ganga Div. III, Varanasi**

Local River : Choti Sarju | **River Water Analysis** | **Sub-Division : M Ganga - C Sarju SD, Varanasi**

S.No	Parameters	6/1/2016	7/1/2016	8/1/2016	9/1/2016	10/1/2016	11/1/2016	12/1/2016	1/2/2017	2/1/2017	3/1/2017	4/1/2017	5/1/2017
		A	A	A	A	A	A	A	A	A	A	A	A
19	SO4 (mg/L)			28.0	34.0	38.0	46.0	42.0	36.0	40.0	55.0	58.0	
	BIOLOGICAL/BACTERIOLOGICAL												
1	BOD3-27 (mg/L)			3.5	2.6	2.2	8.2	3.8	4.1	11.0	16.4	18.8	
2	COD (mg/L)			13.7	26.2	20.1	30.0	24.7	30.6	31.4	38.2	39.2	
3	DO (mg/L)			5.9	6.3	6.0	4.4	4.8	4.6	3.0	1.0	1.6	
4	DO_SAT% (%)			78	88	79	54	53	44	29	10	18	
5	FCol-MPN (MPN/100mL)			1400	800	600	800	500	900	800	1100	1400	
6	Tcol-MPN (MPN/100mL)			4000	2800	2200	2800	1400	2200	2400	3000	3700	
	TRACE & TOXIC												
1	As (µg/L)			1.46				2.73				8.00	
2	Cd (µg/L)			0.16				0.06				0.00	
3	Cr (µg/L)			7.39				0.20				3.00	
4	Pb (µg/L)			0.56				0.33				2.00	
5	Ni (µg/L)			2.91				1.33				12.00	
6	Zn (µg/L)			2.91				2.70				107.00	
7	Cu (µg/L)			11.57				2.71				2.00	
	CHEMICAL INDICES												
	HAR_Ca (mgCaCO3/L)			86	101	108	118	112	103	109	171	156	
1	HAR_Total (mgCaCO3/L)			155	175	190	208	212	193	203	322	300	
2	Na% (%)			27	21	23	24	23	25	26	23	24	
3	RSC (-)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	SAR (-)			1.0	0.8	0.9	1.0	0.9	1.0	1.1	1.2	1.1	
5	**PESTICIDES**												

Water Quality Summary for the period : 2016-2017

Station Name : AKBARPUR (GGVOOT6) | **Division : M Ganga Div. III, Varanasi**

Local River : Choti Sarju | **River Water Summary** | **Sub-Division : M Ganga - C Sarju SD, Varanasi**

S.No	Parameters	Number of Observations	Maximum	Minimum	Mean
	PHYSICAL				
1	Q (cumec)	12	11.95	0.000	2.660
2	EC_FLD (µmho/cm)	9	900	135	503
3	EC_GEN (µmho/cm)	9	908	138	508
4	pH_FLD (pH units)	9	8.1	7.3	7.8
5	pH_GEN (pH units)	9	7.9	7.2	7.7
6	TDS (mg/L)	9	456	85	258
7	Temp (deg C)	9	33.0	14.0	23.3
8	Turb (NTU)	9	4.9	0.1	1.8
	CHEMICAL				
1	Alk-Phen (mgCaCO3/L)	9	0.0	0.0	0
2	ALK-TOT (mgCaCO3/L)	9	210	85	152
3	B (mg/L)	9	0.01	0.00	0
4	Ca (mg/L)	9	68	34	47
5	Cl (mg/L)	9	90.0	40.0	63.1
6	CO3 (mg/L)	9	0.0	0.0	0
7	F (mg/L)	9	0.33	0.19	0.25
8	Fe (mg/L)	9	0.3	0.2	0.2
9	HCO3 (mg/L)	9	257	103	185
10	K (mg/L)	9	16.0	8.0	11.6
11	Mg (mg/L)	9	36.1	16.6	23.9
12	Na (mg/L)	9	48.0	23.0	33.6
13	NH3-N (mg N/L)	9	0.05	0.05	0.05
14	NO2+NO3 (mg N/L)	9	0.35	0.19	0.27
15	NO2-N (mgN/L)	9	0.00	0.00	0
16	NO3-N (mgN/L)	9	0.35	0.19	0.27
17	P-Tot (mgP/L)	9	0.052	0.022	0.04
18	SiO2 (mg/L)	9	10.9	8.5	9.9
19	SO4 (mg/L)	9	58.0	28.0	41.9
	BIOLOGICAL/BACTERIOLOGICAL				
1	BOD3-27 (mg/L)	9	18.8	2.2	7.8
2	COD (mg/L)	9	39.2	13.7	28.2
3	DO (mg/L)	9	6.3	1.0	4.1
4	DO_SAT% (%)	9	88	10	50
5	FCol-MPN (MPN/100mL)	9	3700	500	1389
6	Tcol-MPN (MPN/100mL)	9	4000	1100	2256
	TRACE & TOXIC				
1	As (µg/L)	3	8.00	1.46	4.06
2	Cd (µg/L)	3	0.16	0.00	0.11
3	Cr (µg/L)	3	7.39	0.33	3.53
4	Pb (µg/L)	3	2.00	0.33	0.96
5	Ni (µg/L)	3	12.00	1.33	5.41
6	Zn (µg/L)	3	107.00	2.70	37.5
7	Cu (µg/L)	3	11.57	2.00	5.42
	CHEMICAL INDICES				
1	HAR_Ca (mgCaCO3/L)	9	171	86	118
2	HAR_Total (mgCaCO3/L)	9	322	155	218
3	Na% (%)	9	27	21	24
4	RSC (-)	9	0.0	0.0	0
5	SAR (-)	9	1.2	0.8	1
	PESTICIDES				

Water Quality Seasonal Average for the period: 2014-2017

Station Name : AKBARPUR (GGVOOT6) | **Division : M Ganga Div. III, Varanasi**

Local River : Choti Sarju | **River Water** | **Sub-Division : M Ganga - C Sarju SD, Varanasi**

S.No	Parameters	Flood			Winter			Summer		
		Jun - Oct			Nov - Feb			Mar - May		
		2014	2015	2016	2014-2015	2015-2016	2016-2017	2015	2016	2017
	PHYSICAL									
1	Q (cumec)	1.333	0.642	5.859	1.336	0.000	0.581	0.443	No flow	0.101
2	EC_FLD (µmho/cm)	310	628	192	450	658	563	680		850
3	EC_GEN (µmho/cm)	302	552	194	445	643	568	654		859
4	pH_FLD (pH units)	7.8	7.6	7.7	7.8	7.5	8.0	7.4		7.7
5	pH_GEN (pH units)	8.0	7.6	7.6	8.0	7.7	7.8	7.8		7.6
6	TDS (mg/L)	182	332	103	269	388	288	391		431
7	Temp (deg C)	28.5	28.7	31.0	18.9	18.0	19.0	23.8		20.5
8	Turb (NTU)	3.1	0.7	3.7	0.3	0.4	1.1	0.3		0.2
	CHEMICAL									
1	ALK-TOT (mgCaCO3/L)	104	138	117	104	225	150	135		207
2	B (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
3	Ca (mg/L)	28	32	39	27	43	44	34		65
4	Cl (mg/L)	28.7	36.8	47.3	28.0	36.0	64.0	40.0		85.0
5	F (mg/L)	0.37	0.22	0.21	0.16	0.33	0.24	0.19		0.32
6	Fe (mg/L)	0.1	0.2	0.2	0.1	0.2	0.2	0.2		0.2
7	HCO3 (mg/L)	127	169	143	127	275	183	164		253
8	K (mg/L)	7.3	7.8	9.0	6.5	8.0	11.8	10.3		15.0
9	Mg (mg/L)	11.6	17.4	18.1	11.6	25.1	22.5	15.4		35.4
10	Na (mg/L)	18.0	25.6	26.3	17.3	26.7	32.5	28.7		46.5
11	NH3-N (mg N/L)	0.00	0.00	0.05	0.00	0.00	0.05	0.00		0.05
12	NO2+NO3 (mg N/L)	0.20	0.27	0.24	0.22	0.30	0.25	0.25		0.34
13	NO3-N (mgN/L)	0.20	0.27	0.24	0.22	0.30	0.25	0.25		0.34
14	P-Tot (mgP/L)	0.013	0.023	0.031	0.018	0.032	0.048	0.026		0.037
15	SiO2 (mg/L)	7.1	7.8	9.5	7.2	8.9	10.6	8.2		9.2
16	SO4 (mg/L)	17.7	28.4	33.3	20.0	28.0	41.0	30.0		56.5
	BIOLOGICAL/BACTERIOLOGICAL									
1	BOD3-27 (mg/L)	3.0	8.7	2.8	4.3	6.5	6.8	8.5		17.6
2	COD (mg/L)	19.5	24.4	20.0	19.4	27.5	29.2	24.8		38.7

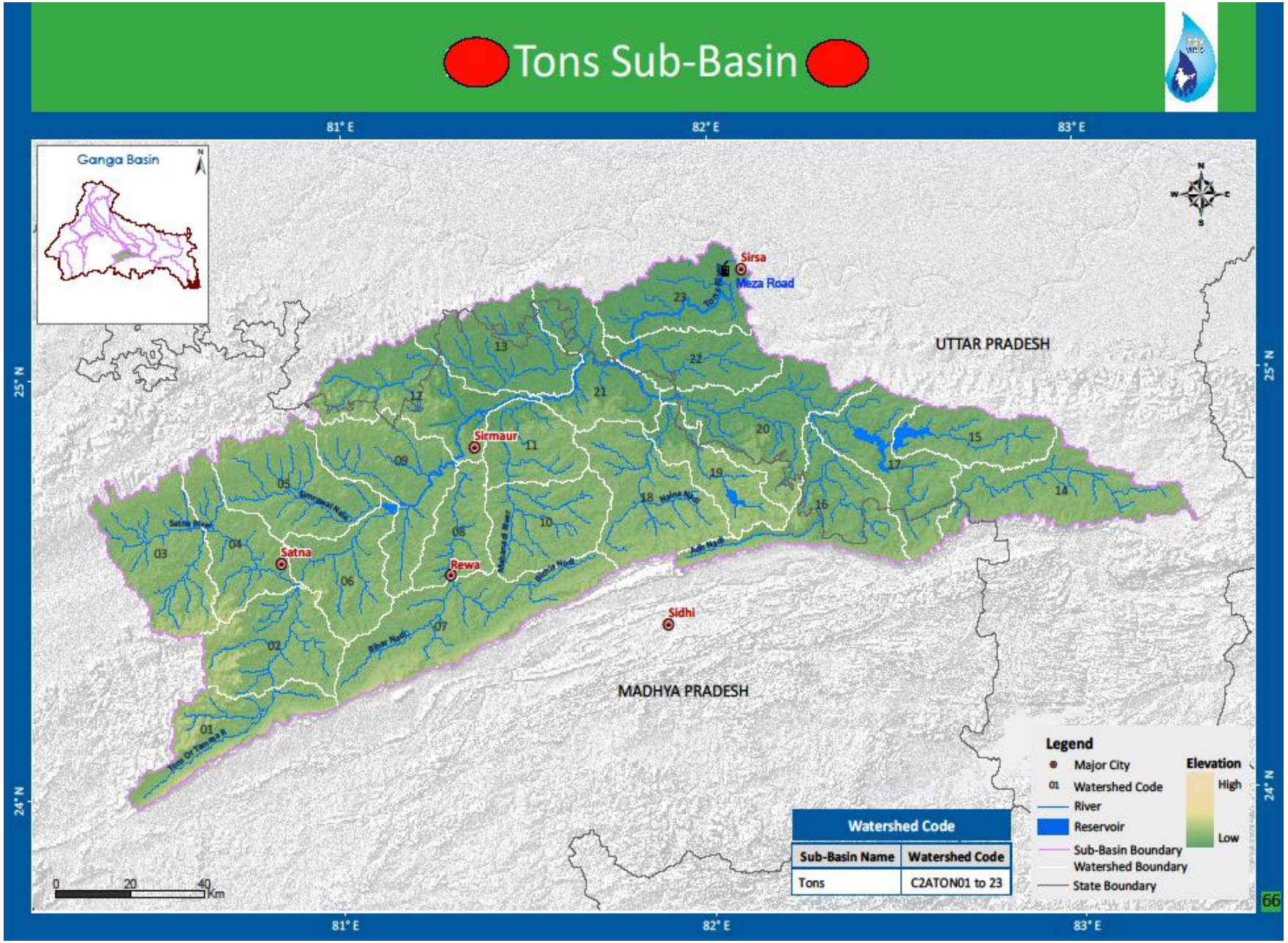
Water Quality Seasonal Average for the period: 2014-2017

Station Name : AKBARPUR (GGVOOT6) | **Division : M Ganga Div. III, Varanasi**

Local River : Choti Sarju | **River Water** | **Sub-Division : M Ganga - C Sarju SD, Varanasi**

S.No	Parameters	Flood			Winter			Summer		
		Jun - Oct			Nov - Feb			Mar - May		
		2014	2015	2016	2014-2015	2015-2016	2016-2017	2015	2016	2017
3	DO (mg/L)	6.8	3.4	6.0	6.0	5.6	4.2	2.5		1.3
4	DO_SAT% (%)	88	44	81	65	58	45	29		14
5	FCol-MPN (MPN/100mL)	1133	1740	933	875	1900	750	1133		1250
6	Tcol-MPN (MPN/100mL)	2267	3920	3000	2150	4367	2200	2567		3350
	TRACE & TOXIC									
1	As (µg/L)			1.46			2.73	8.0		8.00
2	Cd (µg/L)			0.16			0.06	3.0		0.00
3	Cr (µg/L)			7.39			0.20	7.0		3.00
4	Pb (µg/L)			0.56			0.33	9.0		2.00
5	Ni (µg/L)			2.91			1.33	12.0		12.00
6	Zn (µg/L)			2.91			2.70	14.0		107.00
7	Cu (µg/L)			11.57			2.71			2.00
	CHEMICAL INDICES									
1	HAR_Ca (mgCaCO3/L)	69	81	98	68	107	111	85		163
2	HAR_Total (mgCaCO3/L)	117	153	173	116	212	204	149		311
3	Na% (%)	24	25	24	23	21	24	28		24
4	RSC (-)	0.0	0.0	0.0	0.0	0.5	0.0	0.0		0.0
5	SAR (-)	0.7	0.9	0.9	0.7	0.8	1.0	1.0		1.2
	PESTICIDES									

Index Map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83° E
25° N
24° N
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Meza Road
Sirmaur
Satna
Rewa
Sidhi
UTTAR PRADESH
MADHYA PRADESH
Legend
Major City
Watershed Code
River
Reservoir
Sub-Basin Boundary
Watershed Boundary
State Boundary
Elevation
High
Low
Watershed Code
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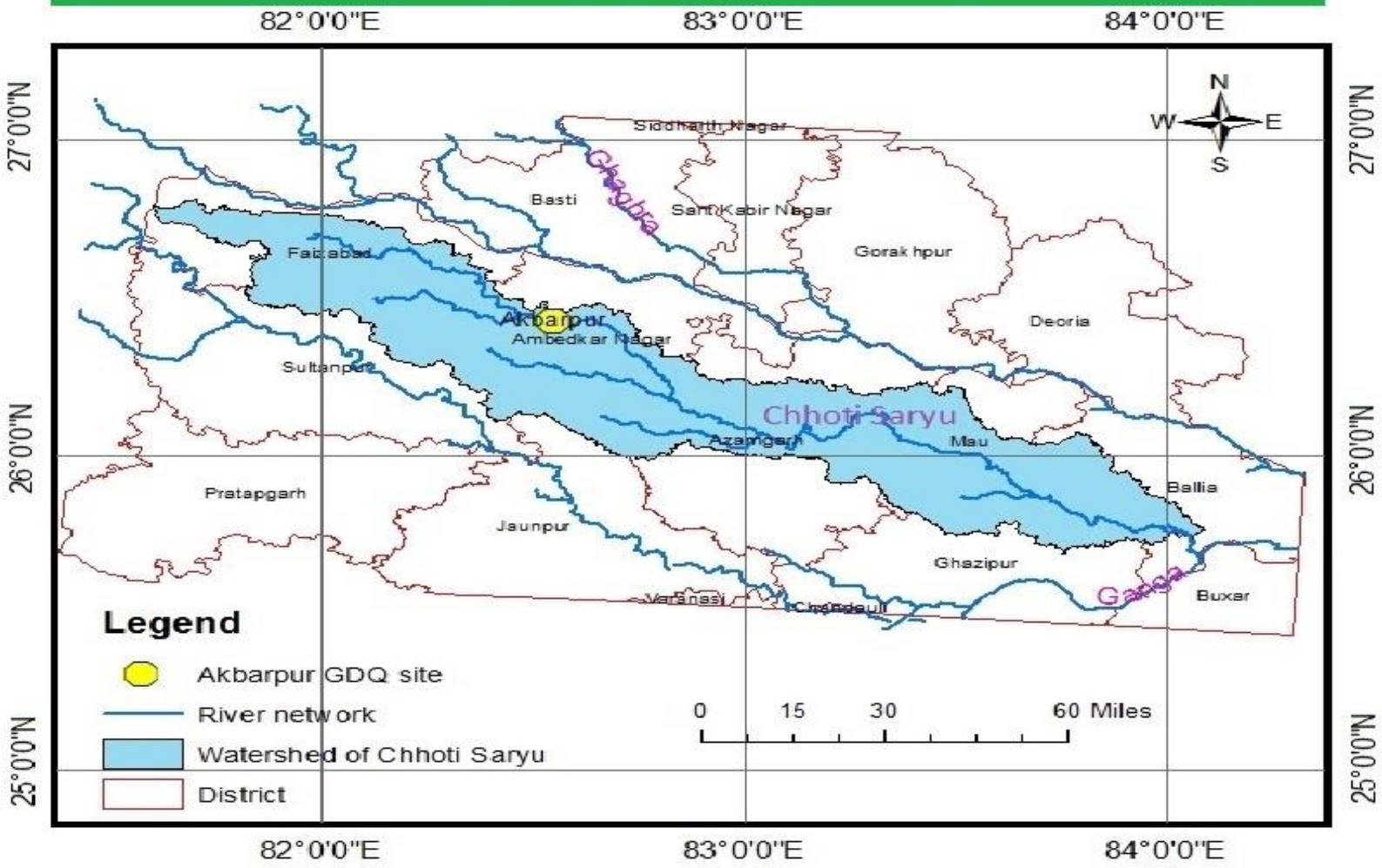
20
40
Km
66

CHHOTI SARYU SUB-BASIN



संक्षिप्त नाम एवं प्रतीक
ABBREVIATIONS AND SYMBOLS

N	: उत्तर/North
E	: पूर्व/East
sq. km.	: वर्ग किलोमीटर/Square Kilometre
m	: मीटर/Metre
o	: डिग्री/Degree
’	: मिनट/Minute
”	: सेकेंड/Second
SP	: सोडियम प्रतिशतता /Sodium Percentage
RSC	:अपशिष्ट सोडियम कार्बोनेट/Residual Sodium Carbonate
SAR	: सोडियम एडजार्प्शन अनुपात/Sodium Adsorption Ratio
HAR	: कठोरता/Hardness
mg/l	: मिग्रा / लीटर Milligram per Litre
ml.	: मिलीलीटर/Millilitre
pH	: हाइड्रोजन आयन का नकारात्मक लघुगणितीय/Negative Logarithm of Hydrogen Ion Concentration